

**FINDING OF NO SIGNIFICANT IMPACT**  
**Enhanced Testing and Associated Training Use of the Giant Reusable Air Blast Simulator Site**  
**Kirtland Air Force Base, New Mexico**

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Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), Title 40 of the Code of Federal Regulations (CFR) §§ 1500-1508; Department of Defense Directive 6050.1 and the Air Force Environmental Impact Analysis Process (EIAP), 32 CFR Part 989, the Defense Threat Reduction Agency (DTRA) in coordination with the Air Force has prepared an Environmental Assessment (EA) to identify and evaluate potential environmental impacts from the proposed enhanced testing and associated training of DTRA's approximately 155-acre Giant Reusable Air Blast Simulator (GRABS) site at Kirtland Air Force Base (AFB), New Mexico.

**DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

**Proposed Action (EA § 1.2, page 16 and § 2.2, pages 19–21).** The mission of GRABS site is to test blast resistance of various structural and equipment components by simulating a nuclear blast using explosives in a variety of scenarios. In 1993 DTRA completed an initial EA, which resulted in a Finding of No Significant Impact (FONSI) addressing activities performed at the GRABS site. Since that time, testing methodologies and types of activities / equipment used continue to change and evolve. Given the length of time that has elapsed, DTRA and the Air Force have determined an update to the 1993 EA is appropriate. This EA describes and evaluates the potential environmental impacts of enhanced testing and associated training activities currently conducted at the GRABS site, as well as reasonably foreseeable future ones. The findings of the 1993 EA, which remain directly relevant to the Proposed Action, are incorporated by reference into this EA. DTRA proposes to continue ongoing explosive test events at the GRABS site and to conduct additional, enhanced test activities in accordance with their current and emerging mission requirements. One of the new tests would use a biological simulate known as *Bacillus thuringiensis kurstaki* (Btk), a naturally occurring aerobic bacterium used in agriculture as a commercial organic insecticide. Because it is closely related to the agent responsible for causing Anthrax, DTRA proposes to simulate the destruction of an Anthrax-producing facility using Btk (less than 10 lbs) and then track the spread of spores in the environment and determine their survivability/vulnerability rate. This type of testing would occur approximately once every two years. Lastly DTRA would improve onsite “housekeeping” of the site to quickly restore to current pre-test conditions. As part of this, DTRA would continue to reconfigure small-scale test structures (i.e. less than 5 acres of ground disturbance) for specific training events. No new major construction or demolition is proposed.

**No Action Alternative (EA § 2.5, page 22).** The No Action Alternative was analyzed to provide a baseline of the existing environmental, social, and economic conditions to compare the Proposed Action against. Under the No Action Alternative, DTRA would not implement the components of the Proposed Action as described above. Onsite testing would be limited to levels identified within the 1993 EA.

**Alternatives Considered but Eliminated from Detailed Analysis (EA § 2.6, pages 22–23).** Alternatives initially considered included utilizing another site controlled by DTRA on Kirtland AFB, relocation of test activities to another installation and a reduced scale alternative. DTRA and the USAF considered the Technical Evaluation Assessment Monitor Site (TEAMS), located on Kirtland AFB, as a potential site. While this site is controlled by DTRA, TEAMS is located in a heavily populated portion of the installation not conducive to explosive testing. In addition the existing mission of TEAMS would be compromised due to introduction of explosive testing in the area. Furthermore, the replacement and relocation of existing established GRABS assets, such as the GRABS silo, shock tube, 20-foot shock tube, shallow water tank, half-space apparatus, concrete tunnel and concrete structure test area and other infrastructure would be cost prohibitive. DTRA considered moving the test activities and structures associated with the GRABS site to another installation, such as the White Sands Missile Range. Relocating these assets to an off-base location would not only be costly but would adversely affect the mission inter-relationship between DTRA's three testing and training sites (GRABS, TEAMS and the Chestnut Test site)

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at Kirtland AFB. Under the reduced scale alternative, DTRA would implement only a partial set of the Proposed Action components; however, failure to fully implement would result in a testing shortfall and not all DTRA to meet their mission requirements. Consequently, these alternatives were not analyzed in further detail.

### **SUMMARY OF ENVIRONMENTAL IMPACTS**

Environmental analyses focused on the following areas: Noise, Visual Resources, Air Quality, Geology/Soils, Water Resources, Biological Resources, Cultural Resources, Infrastructure, Hazardous Material/Waste, Safety and Socioeconomics. Land use was eliminated from further analysis since the designation would remain the same (EA § 3, page 27). Overall, environmental analyses did not identify significant impacts to any of the above resources. In addition, no significant cumulative impacts caused by implementation of the Proposed Action when combined with other past, present, and reasonably foreseeable actions occurring at Kirtland AFB were identified (EA § 4.12, pages 92 – 98).

**Noise (EA § 4.1, pages 71–73).** There would be short-term noise impacts from testing activities, which are negligible and temporary in nature. The noise environment at the GRABS site is generally quiet, punctuated by periodic blast noise from explosive test events. During a 1,000 pounds explosive test event, the sound pressure level can cause tinnitus (ringing of the ears) with a temporary impairment of human hearing standing at a distance of 970 feet. The remote, secure location of the GRABS site ensures no unauthorized personnel would be within the vicinity of the test events. DTRA would also notify individuals if an explosive test event extends greater than 970 feet, in order to reduce/avoid any potential noise impacts. Because noise levels generated from testing of biological stimulants or construction/de-construction of testing structures fall within the same noise contours as the existing environment, there are no impacts from noise with implementation of the Proposed Action.

**Visual Resources (EA § 4.2, pages 73–74).** Ongoing testing activities have produced short-term, temporary impacts to visual resources (i.e. dust clouds resulting from explosions). Due to the existing disturbed nature of the GRABS site and the small amount of ground disturbance proposed (i.e. a maximum of 5 acres per test event), only negligible impacts on visual resources would be anticipated from testing biological stimulants and reconfiguring test structures. Implementation of improved “housekeeping” practices would result in a long-term, beneficial impact on visual resources and improve the general aesthetics of the GRABS site.

**Air Quality (EA § 4.3, pages 74–78).** The Proposed Action is located within Bernalillo County New Mexico, which is designated as attainment/unclassified for all National Ambient Air Quality Standards (NAAQS) criteria pollutants except for carbon monoxide (CO). Fugitive dust emissions would be generated from construction/de-construction activities and from fuel combustion. Quantities would vary depending on the level of activity and prevailing weather conditions. During test events minor quantities of air emissions would be generated; however, these emissions are short-term and rapidly disperse into the atmosphere. Introduction of explosive test events using a biological simulant at a proposed frequency of once every 2 years and at levels equivalent to agricultural use would not result in any long-term, adverse impacts on air quality. In addition, biological simulant testing would only occur when winds are from the south; ensuring lands off the installation would be unaffected. It is estimated the Proposed Action would generate CO emissions of ~ 13.8 tons per year (tpy) (EA Table 15, page 77) during a 1-year period. Based on these levels conformity analysis is not required since emissions are below 100 tpy de minimis threshold. Per New Mexico Administrative Code § 20.11.20, the GRABS site currently operates under Permit #P12-0007, which covers routine maintenance and/or ongoing active operations on existing land or test structures within the 155-acre site. This permit is valid for five years and allows up to five acres of soil disturbance at any given time. The proposed action would adhere to best management practices (BMPs), such as using appropriate dust suppression methods during onsite activities, visually monitoring all activities regularly, particularly during extended periods of dry weather and stabilizing previously disturbed areas through mulching if the area would be inactive for several weeks or more as identified within the existing permit. The GRABS Site emits approximately 1,099.77 tpy of carbon dioxide (CO<sub>2</sub>) or greenhouse gas emission (GHG) under current

conditions. Total CO<sub>2</sub> emissions from construction/de-construction activities represent  $1.73 \times 10^{-5}$  percent of the state of New Mexico's 2008 CO<sub>2</sub> emissions and  $1.71 \times 10^{-7}$  percent of the entire United States' 2008 CO<sub>2</sub> emissions. Based on these levels, ongoing activities at the GRABS site represent a negligible contribution toward statewide and national GHG inventories. Overall, there would be no long-term, significant impacts on air quality from implementing the Proposed Action.

**Geology and Soils (EA § 4.4, pages 78–79).** Per conclusions presented in the 1993 EA, the majority of impacts to geologic resources are from surface disturbance during construction of test structures. This arises because of the type of the soils exposed and the difficulty in re-vegetating. Extensive literature searches and contacts with personnel from the Bureau of Mines, Waterways Experiment Station, U.S. Geological Survey and other DOD organizations involved in high explosive detonations indicate significant contamination of soil by detonation products has never been observed. Nor would there be any impacts to soil from the use of a biological simulant since there is no ground disturbance associated with this type of testing. The introduction of improved "housekeeping" at the site would result in a long-term, beneficial impact on geology and soils. Overall there would be no significant impacts to geology and soils.

**Water Resources (EA § 4.5, pages 80–82).** The two main surface water drainage channels on Kirtland AFB are the Tijeras Arroyo and the smaller Arroyo del Coyote; the GRABS site lies approximately 2.1 miles south of Arroyo del Coyote. There are no floodplains or wetlands within the GRABS site. Surface water drains to the northeast / south and terminates prior to intersecting any large surface water feature (EA Figure 6, page 45). Groundwater at the GRABS site has been encountered 135 to 240 feet below ground surface. The 1993 EA determined detonation activities would not impact groundwater; samples collected analyzing for cyanide, ammonia and nitrates were well within the federal standards for potable water. Nor would these activities impact surface water. The majority of gaseous detonation products is consumed by the explosion or reacts within the atmosphere to form water, CO<sub>2</sub> and nitrogen compounds. The remaining solid compounds left behind would include aluminum oxide, gypsum and carbon, all of which occur naturally within a desert environment. The greatest potential the Proposed Action has to water resources are secondary impacts from various ground disturbance activities (i.e. minor construction) where soils are exposed and natural drainage patterns are altered. Because Kirtland AFB operates under three National Pollutant Discharge Elimination System (NPDES) permits (general storm water permit for industrial activities, watershed municipal separate storm sewer system permit and construction general permit for construction projects), the GRABS site is subject to these requirements. Prior to construction activities, DTRA would obtain the appropriate NPDES permits, including submission and approval of a site-specific storm water pollution prevention plan (SWPPP) and associated BMPs to control soil erosion and to limit surface water resource impacts during proposed construction activities; therefore no long-term, significant impacts on surface waters are expected.

**Biological Resources (EA § 4.6, pages 82–85).** The GRABS site lies within a partially disturbed area of Kirtland AFB. No threatened or endangered species have been identified nor is it designated as critical habitat. Vegetation within the site would be impacted by the various ground-disturbing activities (i.e. detonations, construction equipment, etc.); however, these impacts would not be significant since DTRA personnel would return the site to pre-project conditions following each testing event. There would be temporary noise impacts on wildlife associated with periodic, small-scale construction and explosive test events. These impacts would negligible and consistent with existing conditions; currently there have been no documented adverse effects to local wildlife species or their habitat. The quantities of Btk proposed for release at the GRABS site are less than 10 pounds per testing event. Introduction of Btk in the environment is not a concern to wildlife species; Btk is a widely used pesticide in commercial agricultural operations to control populations of leaf-eating caterpillars. It reacts specifically with a protein within the caterpillar's digestive system. Humans and other non-target wildlife species are considered safe as their digestive system does not react to Btk. In addition Btk degrades in sunlight and would persist for less than 1 week following a test event. In a scoping response received April 8, 2013, New Mexico Department of Game and Fish stated they do not anticipate adverse impacts to wildlife or important wildlife

habitats with implementation of the Proposed Action. Overall, there would be no significant impact to biological resources.

**Cultural Resources (EA § 4.7, pages 85–86).** There is one National Register of Historic Places-eligible site located northwest of the GRABS site, a World War II-era fuse launch pad. Because the GRABS site has been identified by Kirtland AFB as having a moderate potential for buried cultural deposits, a cultural resources survey of the area was completed in November 1993. This survey identified no cultural resources and recommended an archaeological clearance for the site. Based on these findings, DTRA and the Air Force determined the likelihood that previously unknown or undocumented cultural sites being encountered during ground disturbing activities to be low. In written correspondence dated July 11, 2013, the State Historic Preservation Office concurred with DTRA's and Kirtland AFB's finding of "no effect" to historic properties from this proposed undertaking. DTRA and the Air Force also consulted with various Native American tribes, who had no comments. It was determined there would be no significant impacts on cultural resources with implementation of the Proposed Action.

**Infrastructure (EA § 4.8, pages 86–88).** Ongoing, periodic construction and de-construction activities associated with the Proposed Action have the potential to impact the existing transportation system through traffic delays. During each explosive test event, Target Road may be closed to ensure the health and safety of on-base personnel; however, early coordination with Kirtland AFB would reduce potential impacts. Due to the nature of the Proposed Action and the existing conditions of the GRABS site, no impacts on the electrical system, natural gas/propane, sanitary sewer/waste water system and liquid fuel system would be anticipated from construction/de-construction and ground disturbance. Materials would be recycled / reused to reduce the amount of construction waste going to the landfills. Overall, the Proposed Action would not result in significant impacts on infrastructure.

**Hazardous Materials and Waste (EA § 4.9, pages 88–90).** The Proposed Action would not generate asbestos-containing material, lead-based paint, or polychlorinated biphenyls waste. Construction and de-construction activities would result in negligible quantities of hazardous or petroleum wastes. No impacts on the hazardous materials program would be expected from conducting tests using explosives or Btk. Detonation products released during explosive tests are naturally-occurring substances. Btk is not considered a hazardous material or toxic substance. The GRABS site is not within or adjacent to any surface danger zone associated with existing defense ranges, installation restoration program sites or munitions response areas. Overall, the Proposed Action would not result in significant impacts on hazardous materials and waste management.

**Safety (EA § 4.10, pages 90–91).** No adverse impacts on military personnel or public safety would be anticipated. Non-essential installation personnel would be required to vacate construction and test areas. Access to the construction work sites and test areas would be limited and controlled to further reduce safety risks. DTRA would continue to implement the extensive health and safety procedures and programs, ensuring all personnel utilizing the GRABS site receive an unexploded ordnance safety brief prior to going onsite. No impacts would be anticipated. Implementation of Btk-related explosive test events would occur once every 2 years and only when winds are from the south; therefore, no adverse impacts on health and safety would be anticipated. Radiological materials are not used at the GRABS site; therefore, no significant impacts would be anticipated from implementation of the Proposed Action.

**Socioeconomics and Environmental Justice (EA § 4.11, pages 91–92).** No long-term change in employment is anticipated under the Proposed Action and no additional full-time personnel are needed. Because the GRABS site is located within a controlled area of Kirtland AFB, there are no populations of minority, low-income and children disproportionately impacted by the Proposed Action; therefore, impacts are insignificant.

prior to taking any specific action. DTRA will be responsible for submitting all environmental permits/plans identified within the EA to local, state, and federal agencies. The 377 MSG/CEIE will oversee and verify these permits and BMPs are fully funded by the proponent and are in place and being carried out, as identified in this FONSI and accompanying EA.

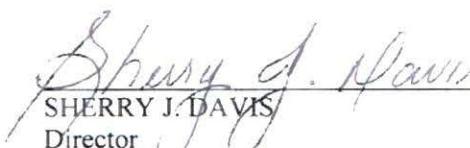
#### **PUBLIC REVIEW AND COMMENT**

The draft EA was available for public review and comment from 30 October to 28 November 2014 at the Central New Mexico Community College, Montoya Library, 4700 Morris NE, Albuquerque, New Mexico 87102; and San Pedro Library, 5600 Trumbull Avenue SW, Albuquerque, New Mexico 87108; and at the web link <http://www.kirtland.af.mil>. On 24 November 2014, a representative from the San Felipe Tribe contacted Kirtland AFB requesting an additional 30 days to review and comment on the Draft EA. This extended the comment period to 28 December 2014. No public comments were received.

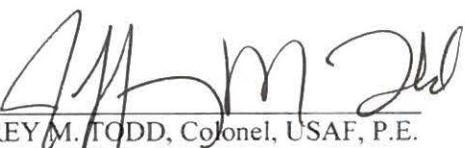
Three responses from government agencies (U.S. Forest Service, Mid-Region Council of Governments, and the New Mexico Environment Department [NMED]) and one from the Navajo Nation were received during the interagency and intergovernmental coordination process. Comments from NMED noted permit requirements associated with activities to the extent relevant to the GRABS site activities. DTRA has or will obtain all necessary permits relevant to the proposed GRABS site activities. All other responses from government and tribal agencies stated they had no concerns with the Proposed Action.

#### **FINDING OF NO SIGNIFICANT IMPACT**

Based on review of the facts and analyses contained in the attached EA, DTRA and the Air Force have determined the Proposed Action to begin enhanced use testing at the GRABS site will not have a significant environmental impact on the natural or human environment, either by itself or cumulatively. Accordingly, the requirements of National Environmental Policy Act, the regulations promulgated by the Council on Environmental Quality 40 CFR §§ 1500–1508 and the Air Force EIAP regulations 32 CFR § 989 are fulfilled and an Environmental Impact Statement is not required.

  
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SHERRY J. DAVIS  
Director  
Environmental, Safety, and  
Occupational Health (J4E)

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
JEFFREY M. TODD, Colonel, USAF, P.E.  
Command Civil Engineer  
Communications, Installations  
and Mission Support

  
\_\_\_\_\_  
Date

# *Final*

## Environmental Assessment

Proposed Enhanced Testing and  
Associated Training Use of the  
Giant Reusable Air Blast Simulator (GRABS) Site  
at  
Kirtland Air Force Base, New Mexico



February 2015



## ACRONYMS AND ABBREVIATIONS

377 ABW	377th Air Base Wing	EtC	Embudo-Tijeras complex, 0 to 9 percent slopes
377 MSG/ CEIE	377 Mission Support Group/Civil Engineering Installation Management – Environmental Management	FONSI FPPA FY GHG GRABS HAP HASPA HE HST-20 HWMP ICRMP ILC in/sec INRMP kPa JD JP-8 LBP LID LtB MBTA MGD mm MMRP MS4 MSA MWA NAAQS NEPA NEW NFA NHPA NMAC NMDGF NMED NO <sub>2</sub> NO <sub>x</sub> NOA NOI	Finding of No Significant Impact Farmland Protection Policy Act Fiscal Year greenhouse gas Giant Reusable Air Blast Simulator hazardous air pollutant Health and Safety Plan Health and Safety Risk Analysis high explosive 20-foot shock tube Hazardous Waste Management Plan Integrated Cultural Resources Management Plan Ildefonso gravelly sandy loam, 1 to 9 percent slopes inches per second Integrated Natural Resources Management Plan kilopascal Jurisdictional Determination jet propellant – type 8 lead-based paint Low Impact Design Latene sandy loam, 1 to 5 percent slopes Migratory Bird Treaty Act million gallons per day millimeter Military Munitions Response Program Municipal Separate Storm Sewer System Metropolitan Statistical Area Madurez-Wink association, gently sloping National Ambient Air Quality Standards National Environmental Policy Act net explosives weight No Further Action National Historic Preservation Act New Mexico Administrative Code New Mexico Department of Game & Fish New Mexico Environmental Department nitrogen dioxide nitrogen oxide Notice of Availability Notice of Intent
ACM	asbestos-containing material		
AEHD-AQD	Albuquerque Environmental Health Department - Air Quality Division		
AFB	Air Force Base		
AFI	Air Force Instruction		
AFRL	Air Force Research Laboratory		
AMRG	Albuquerque-Mid Rio Grande Intrastate		
amsl	above mean sea level		
ANFO	Ammonium Nitrate Fuel Oil		
APE	Area of Potential Effect		
AQCR	Air Quality Control Region		
bgs	below ground surface		
BMP	Best Management Practice		
Btk	<i>Bacillus thuringiensis kurstaki</i>		
C-4	Composite 4		
CAA	Clean Air Act		
CEQ	Council on Environmental Quality		
CFR	Code of Federal Regulations		
CGP	Construction General Permit		
CH <sub>4</sub>	methane		
CO	carbon monoxide		
CO <sub>2</sub>	carbon dioxide		
CWA	Clean Water Act		
dB	decibel		
dBA	A-weighted decibel		
DDESB	Department of Defense Explosives Safety Board		
DOD	Department of Defense		
DOE	Department of Energy		
DOPAA	Description of the Proposed Action and Alternatives		
DTRA	Defense Threat Reduction Agency		
EA	Environmental Assessment		
EESOH-MIS	Enterprise Environmental, Safety, and Occupational Health Management Information System		
EISA	Energy Independence and Security Act		
ELG	Effluent Limitations Guidelines		
EMS	Environmental Management System		
EO	Executive Order		
EOD	Explosive Ordnance Disposal		
ER	Environmental Restoration		
ERP	Environmental Restoration Program		
ESA	Endangered Species Act		
ESP	Explosives Site Plan		

GRABS Site		Final Environmental Assessment	
NPDES	National Pollutant Discharge Elimination System	SWPPP	Storm Water Pollution Prevention Plan
NRHP	National Register of Historic Places	TEAMS	Technical Evaluation Assessment
O <sub>3</sub>	Ozone	TgB	Monitor Site
ODS	ozone-depleting substance	TMDL	Tijeras gravelly fine sandy loam, 1 to 5 percent slopes
OSH	Occupational Safety and Health	TNT	Total Maximum Daily Load
OSHA	Occupational Safety and Health Administration	TNW	trinitrotoluene
Pb	Lead	TPH	Traditional Navigable Water
PCB	polychlorinated biphenyls	tpy	total petroleum hydrocarbons
PETN	pentaerythritol tetranitrate	TSCA	tons per year
PM <sub>2.5</sub>	particulate matter equal to or less than 2.5 microns in diameter	UFC	Toxic Substance Control Act
PM <sub>10</sub>	particulate matter equal to or less than 10 microns in diameter	U.S.	Unified Facilities Code
PPE	personal protective equipment	USAF	United States
PSD	Prevention of Significant Deterioration	USC	United States Air Force
psi	pounds per square inch	USDA	United States Code
RCRA	Resource Conservation and Recovery Act	NRCS	U.S. Department of Agriculture
S/V	Survivability/Vulnerability	NRCS	Natural Resources Conservation Service
SAAQS	State Ambient Air Quality Standards	µg/m <sup>3</sup>	micrograms per cubic meter
SDWA	Safe Drinking Water Act	USACE	U.S. Army Corps of Engineers
SHPO	State Historic Preservation Office	USEPA	U.S. Environmental Protection Agency
SIP	State Implementation Plan	USFWS	U.S. Fish and Wildlife Service
SNL	Sandia National Laboratories	USGS	U.S. Geological Survey
SO <sub>2</sub>	sulfur dioxide	UXO	unexploded ordnance
SOP	Standard Operating Procedure	VA	volt-amperes
SSPP	Strategic Sustainability Performance Plan	VOC	volatile organic compound
		WaB	Wink fine sandy loam, 0 to 5 percent slopes
		WMD	weapons of mass destruction

**FINAL  
ENVIRONMENTAL ASSESSMENT  
  
PROPOSED ENHANCED TESTING AND ASSOCIATED  
TRAINING USE OF THE  
GIANT REUSABLE AIR BLAST SIMULATOR (GRABS)  
SITE  
  
AT  
KIRTLAND AIR FORCE BASE, NEW MEXICO**

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**DEFENSE THREAT REDUCTION AGENCY  
AND  
UNITED STATES AIR FORCE**

**KIRTLAND AIR FORCE BASE, NEW MEXICO**

**FEBRUARY 2015**



## COVER SHEET

### FINAL ENVIRONMENTAL ASSESSMENT PROPOSED ENHANCED TESTING AND ASSOCIATED TRAINING USE OF THE GIANT REUSABLE AIR BLAST SIMULATOR (GRABS) SITE AT KIRTLAND AIR FORCE BASE, NEW MEXICO

**Proposed Action:** The Defense Threat Reduction Agency (DTRA) and the United States Air Force (USAF) propose enhanced testing and associated training use of DTRA's approximately 155-acre Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland Air Force Base (AFB).

**Report Designation:** Final Environmental Assessment (EA).

**Responsible Agency:** DTRA and the USAF, Kirtland AFB.

**Affected Location:** Kirtland AFB, New Mexico.

**Abstract:** DTRA and the USAF propose enhanced testing and associated training use of the GRABS Site for explosives testing. The mission of the GRABS Site is to test the blast resistance of various structural and equipment components by simulating a nuclear blast using explosives in a variety of scenarios. Other explosive-related test events are also conducted. The GRABS Site, in operation since 1971, has an existing net explosives weight (NEW<sup>1</sup>) limit of 900 pounds for a variety of explosive testing scenarios. Historically, a NEW of up to 2,000 pounds has been detonated at the Site during any one test.

In 1993, DTRA completed an EA addressing activities performed and proposed at the GRABS Site. Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), and the USAF NEPA regulation (32 CFR Part 989). No complaints from the public have been received due to any explosives or other testing conducted at the GRABS Site.

Given the length of time that has elapsed since the 1993 EA, DTRA and the USAF have determined that an update to the 1993 EA is appropriate. This EA describes and evaluates the potential environmental impacts of enhanced testing and training use of the GRABS Site, as well as reasonably foreseeable future activities at the Site, using current environmental data and current testing terminology, which may have changed over the course of the last 20 years. However, the maximum NEW limit of 900 pounds at the Site would not change. DTRA would continue to follow and implement existing health and safety plans, including the GRABS Explosives Site Plan and the site-specific Health and Safety Risk Analysis. This EA describes ongoing testing and associated training activities at the Site, as well as reasonably foreseeable future activities at the Site.

The analysis in the EA considers the Proposed Action and the No Action Alternative.

For additional information on this EA, please contact Kirtland AFB NEPA Program Manager by mail at 377 MSG/CEIE, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB, New Mexico 87117-5270, or via email to [nepa@us.af.mil](mailto:nepa@us.af.mil).

<sup>1</sup> The NEW is based on explosives compounds that are equal to 1 pound of trinitrotoluene (TNT). A compound may weigh 2 pounds but have the blast effects of only 1 pound of TNT; it is then said to have a NEW of 1 pound.

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**FINAL ENVIRONMENTAL ASSESSMENT  
PROPOSED ENHANCED TESTING AND ASSOCIATED TRAINING USE OF THE  
GIANT REUSABLE AIR BLAST SIMULATOR (GRABS) SITE  
AT KIRTLAND AIR FORCE BASE, NEW MEXICO**

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**APPENDICES**

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- Appendix B.** Example Explosives Site Plans, Standard Operating Procedures, Health and Safety Risk Analysis, and GRABS Site Noise Management Process
- Appendix C.** GRABS Site Fugitive Dust Control Programmatic Permit and Kirtland AFB Open Burn Permit
- Appendix D.** Applicable Laws, Regulations, Policies, and Planning Criteria
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## 1. PURPOSE OF AND NEED FOR ACTION

### 1.1 Introduction

This section describes the purpose of and need for the Proposed Action at Kirtland Air Force Base (AFB); provides summaries of the scope of the environmental review process and the applicable regulatory requirements; and presents an overview of the organization of the document.

Federal agencies are required to consider the environmental consequences of their proposed actions in the decision-making process under the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] §§4321–4370d) and the Council on Environmental Quality's (CEQ) implementing regulations for NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508). Kirtland AFB is also required to consider the United States Air Force (USAF) NEPA implementing regulation (32 CFR Part 989) and Department of Defense (DOD) Instruction 4715.9, *Environmental Planning Analysis*.

An Environmental Assessment (EA) describing and evaluating the potential environmental impacts of enhanced testing and training use of the Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland AFB, as well as reasonably foreseeable future activities at the Site, has been prepared in accordance with NEPA and the above-referenced regulations. This EA evaluates the potential environmental impacts associated with the enhanced testing and training activities at the Defense Threat Reduction Agency's (DTRA) approximately 155-acre GRABS Site at Kirtland AFB (see **Figure 1**).

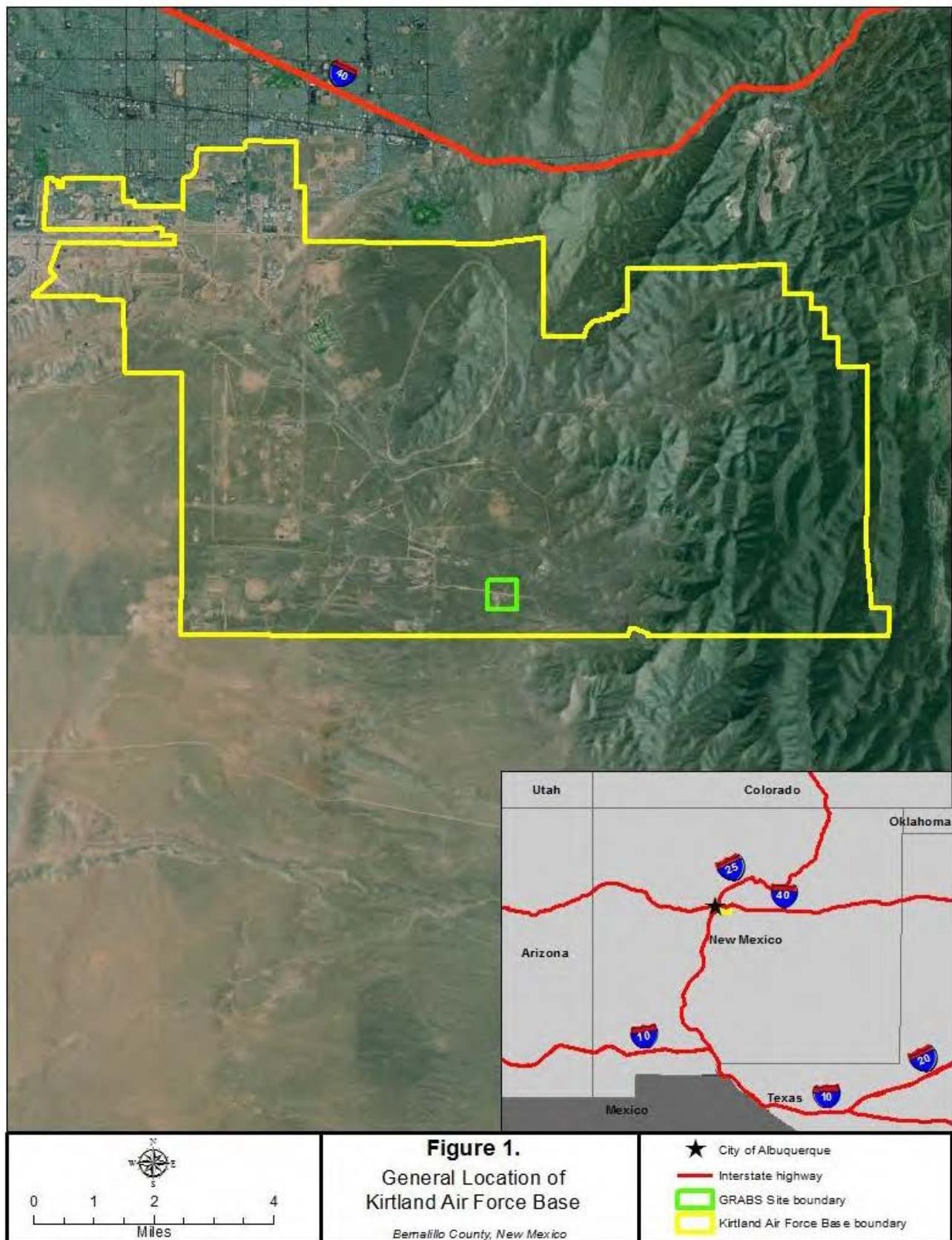
#### 1.1.1 Prior GRABS Site NEPA Analysis

In 1993, DTRA's predecessor agency, the Defense Nuclear Agency, completed an EA resulting in a Finding of No Significant Impact (FONSI) addressing activities performed and proposed at the GRABS Site (Defense Nuclear Agency 1993). Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with NEPA, the CEQ regulations implementing NEPA, and the USAF NEPA implementing regulation. No complaints from the public have been received due to any explosives or other testing conducted at the GRABS Site.

The proposed action analyzed in the 1993 EA included the relocation to the GRABS Site and operation of shock tubes, a shallow water shock tank, a detonation tank, and a half-space apparatus. These test and research systems are still being used at the GRABS Site (see **Section 1.1.5**), the existing maximum net explosives weight (NEW<sup>2</sup>) limit of 900 pounds at the Site has not changed, and the findings of the 1993 EA remain applicable. The proposed action discussed in the 1993 EA is the current, ongoing operation of the GRABS Site; the 1993 EA determined that this proposed action would not result in any significant adverse impacts on existing conditions (Defense Nuclear Agency 1993).



<sup>2</sup> The NEW is based on explosives compounds that are equal to 1 pound of trinitrotoluene (TNT). A compound may weigh 2 pounds but have the blast effects of only 1 pound of TNT; it is then said to have a NEW of 1 pound.



However, given the length of time that has elapsed since the 1993 EA and FONSI, DTRA and the USAF have determined that an update to the 1993 EA is appropriate. This current EA describes and evaluates the potential environmental impacts of enhanced testing and associated training activities at the GRABS Site, as well as reasonably foreseeable future activities at the Site, using current environmental data and current testing terminology, which may have changed over the course of the last 20 years.

The findings of the 1993 EA remain directly relevant to the Proposed Action analyzed in this EA and are incorporated by reference herein, where appropriate, per the CEQ regulations at 40 CFR §1502.21. These regulations encourage federal agencies to “incorporate material into an environmental (document) by reference when the impact will be to cut down the bulk without impeding agency and public review of the action. The incorporated material shall be cited...and its content briefly described”. The analysis and findings of the prior 1993 EA are referenced throughout this EA, where appropriate, and the associated FONSI is included in **Appendix A**.

DTRA would continue to follow and implement existing health and safety plans (HASPs), including the GRABS Explosives Site Plan (ESP) and the site-specific Health and Safety Risk Analysis (HASRA). This EA describes and evaluates the potential environmental impacts of enhanced testing and associated training use of the GRABS Site, as well as reasonably foreseeable future activities at the Site.

### **1.1.2 Kirtland AFB Overview**

Kirtland AFB is located just southeast of Albuquerque, New Mexico (see **Figure 1**) at the foot of the Manzano Mountains. These mountains define the eastern boundary of an area called the East Mesa. Kirtland AFB encompasses 51,585 acres of the East Mesa and has an average elevation of 5,400 feet above mean sea level (amsl). Land uses for areas adjacent to the installation include the Cibola National Forest to the northeast and east, the Isleta Pueblo Indian Reservation and the Cibola National Forest (including the Manzano Wilderness Area) to the south, and residential and business areas of the city of Albuquerque to the west and north.

Kirtland AFB was established in the late 1930s as a training installation for the Army Air Corps. In 1941, construction of permanent barracks, warehouses, and a chapel was completed and a B-18 bomber, Kirtland AFB’s first military aircraft, arrived. Troops soon followed, and Kirtland AFB grew rapidly with the United States’ involvement in World War II. The installation served as a training site for aircrews for many of the country’s bomber aircraft, including the B-17, B-18, B-24, and B-29. After World War II, Kirtland AFB evolved from a training facility to a test and evaluation facility for weapons delivery, working closely with both Los Alamos National Laboratory and Sandia National Laboratories (SNL). In 1971, Kirtland AFB and its adjoining neighbor to the east, Sandia Army Base, were combined. The two divisions of the installation are still referred to as Kirtland West and Kirtland East, respectively. Kirtland AFB is now operated by the USAF.

The 377<sup>th</sup> Air Base Wing (ABW) of the USAF is a unit of the Air Force Materiel Command and is the host unit at Kirtland AFB. The 377 ABW’s prime mission is to support more than 150 mission partners, including DTRA, with personnel, resources, equipment, and facilities. The installation functions as a test and evaluation center for the Air Force Research Laboratory (AFRL), Space and Missile Systems Center, and Air Force Operational Test and Evaluation Center; it is also the headquarters for operational organizations, such as the Air Force Inspection Agency and SNL. Kirtland AFB also functions as a training installation for the 58th Special Operations Wing of the Air Education and Training Command. The 150th Fighter Wing of the New Mexico Air National Guard is also stationed at the installation.

The 377 ABW provides fire protection (including crash and rescue) for the Albuquerque International Sunport, located immediately to the west of the installation.

### 1.1.3 Defense Threat Reduction Agency Overview

DTRA is a mission partner of the USAF. Specifically, DTRA is the field operations element of the former Defense Nuclear Agency, which was originally the Manhattan Engineer District, formed in 1942 during the Manhattan Project to develop the world's first nuclear weapon. DTRA's research helps ensure that United States Forces are prepared to operate on future battlefields where opponents may possess conventional, nuclear, biological, or chemical warfare capabilities.

DTRA maintains the accountability database on all nuclear weapons in the national stockpile; conducts nuclear weapons effects tests using non-nuclear high explosives and thermal, electromagnetic pulse, and radiation simulation facilities; conducts Joint Nuclear Surety Inspections of all Armed Services nuclear-capable units; provides arms control and counter-proliferation support; provides Cooperative Threat Reduction Program support; and operates the Defense Threat Reduction University.

The DTRA Test Support Division provides end-to-end test event planning, management, safe execution, and results analysis supporting DOD, federal agencies, and friendly nations programs to counter the proliferation of and to defeat weapons of mass destruction (WMD).

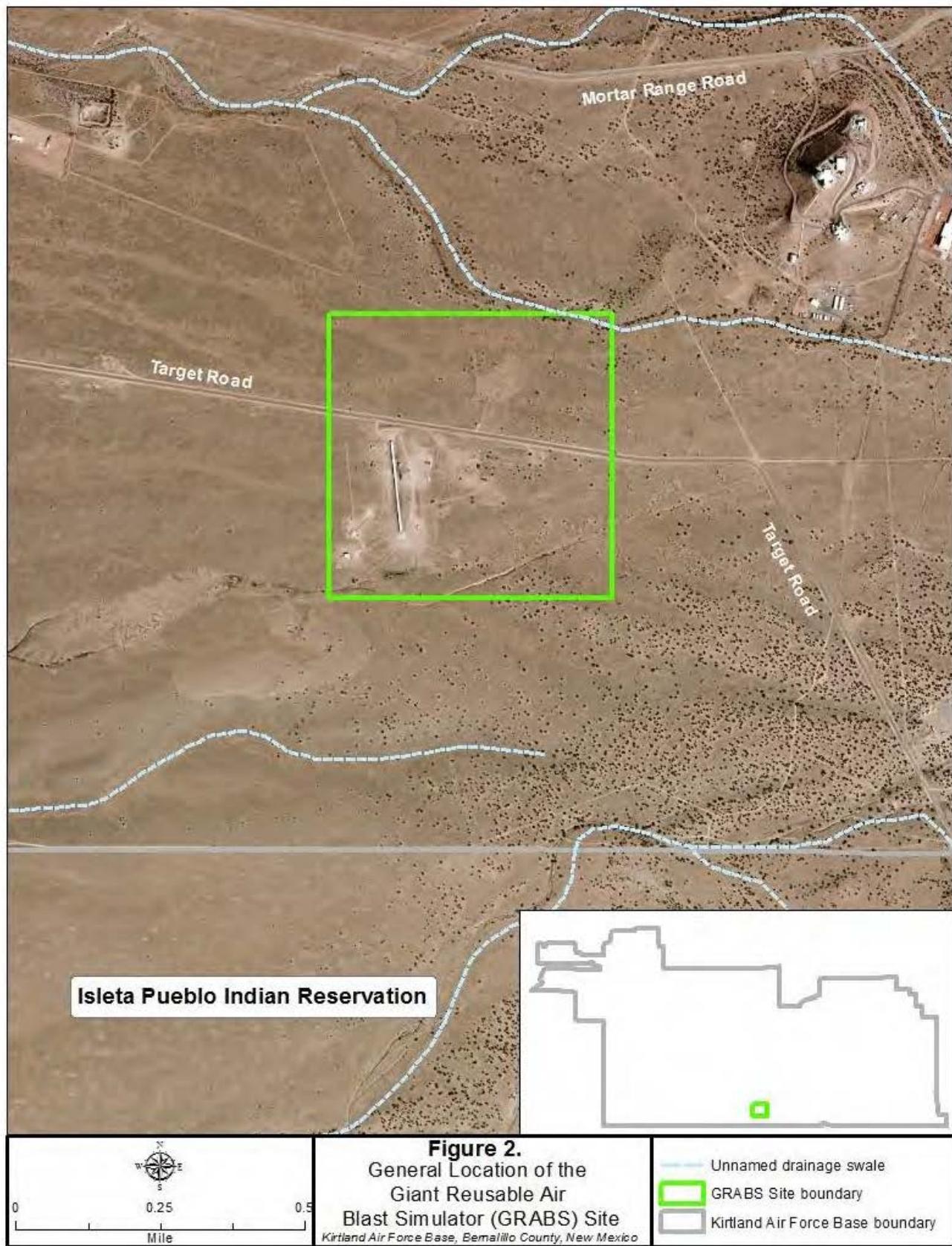
According to DTRA's website, "DTRA is the DOD's official Combat Support Agency for countering weapons of mass destruction. Our people are Subject Matter Experts on WMD, and we address the entire spectrum of chemical, biological, radiological, nuclear and high yield explosive threats. DTRA's programs include basic science research and development, operational support to United States (U.S.) warfighters on the front line, and an in-house WMD think tank that aims to anticipate and mitigate future threats long before they have a chance to harm the United States and our allies. We work with the military services, other elements of the United States government, and countries across the planet on counterproliferation, nonproliferation and WMD reduction issues with one goal in mind: Making the World Safer" (DTRA 2013).

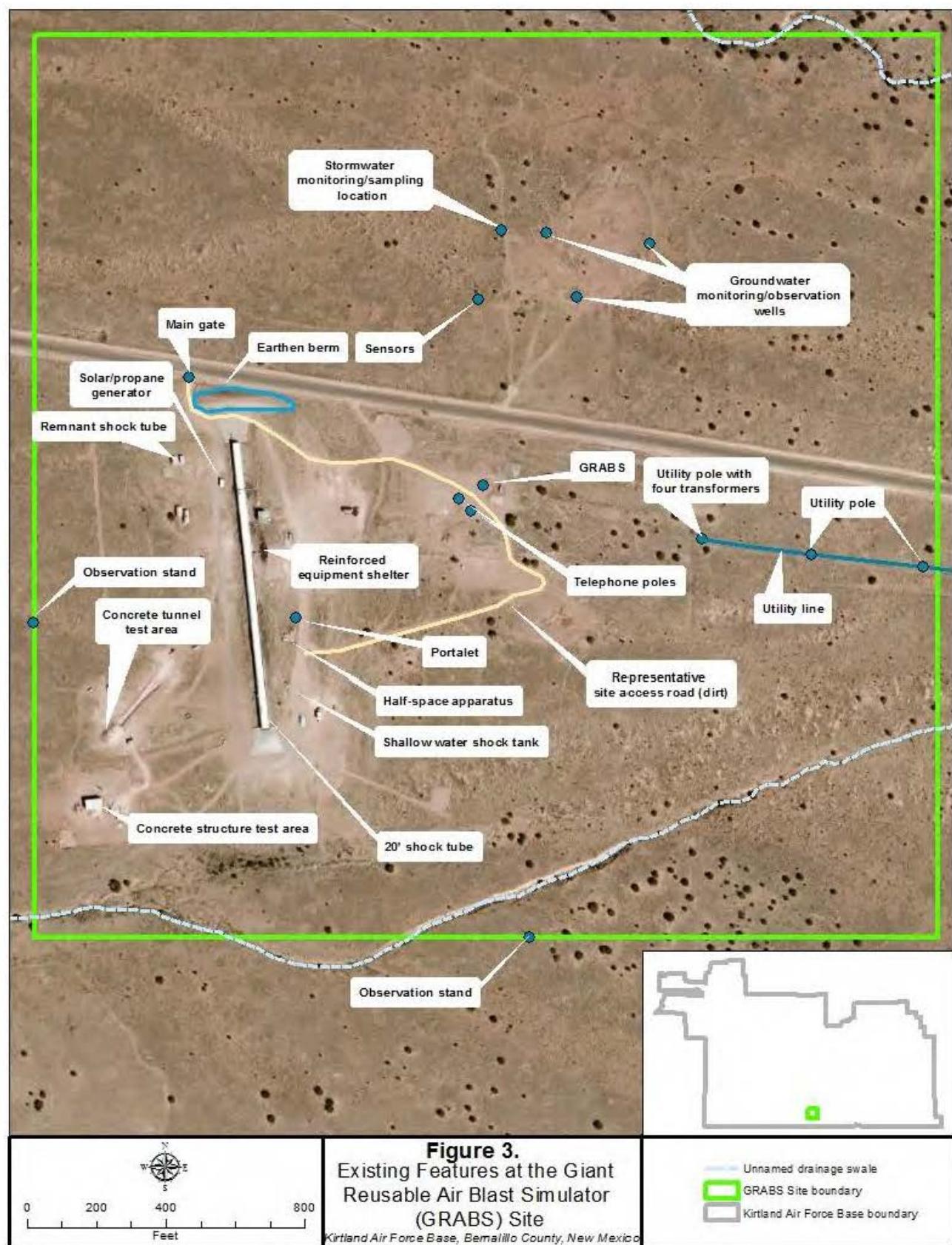
Within the boundaries of Kirtland AFB, DTRA operates three separate testing sites: the GRABS Site; the Chestnut Test Site<sup>3</sup>; and the Technical Evaluation Assessment Monitor Site (TEAMS). The GRABS and Chestnut Test Sites are used as explosives detonation testing sites, with the GRABS Site used for small-scale explosives testing and the Chestnut Test Site used for mid-scale explosives testing; DTRA uses testing facilities at White Sands Missile Range for large-scale explosives testing. The TEAMS is not used for explosives testing. The primary mission of the TEAMS is to perform preliminary technical evaluation, assessment, demonstration, calibration, training, fielding, integration, and concept of operations development of new and emerging nuclear material, commercial-off-the-shelf detection technologies. DTRA's mission also includes using the TEAMS as a test bed for other Radiological, Nuclear, and high Explosives detection testing and training (search/survey) activities. The mission of the GRABS Site is discussed further below.

### 1.1.4 GRABS Site Overview

The approximately 155-acre GRABS Site, located in the mostly undeveloped southern portion of Kirtland AFB and bisected by Target Road, is operated under the direction of DTRA (see **Figures 2 and 3**). The GRABS Site has been in operation since 1971 and has served as a site for various blast and shock effects (simulating nuclear weapons and WMD effects) testing since that time. Prior to its development as the GRABS Site in 1971 by DTRA's predecessor agency, the parcel was used by the U.S. Army during 1944 and 1945 as an impact range for artillery practice. In the early 1950s, SNL used the Site for proximity-fuse testing. Although the Site has been swept by Explosive Ordnance Disposal (EOD) teams, a chance for encountering buried ordnance still

<sup>3</sup> The Chestnut Test Site is operated by AFRL, and is a joint use site between DTRA and AFRL.





exists on the Site. All personnel using the Site are given an unexploded ordnance (UXO) safety brief prior to going onsite; the Kirtland AFB EOD team is notified and removes or detonates in-place any identified UXO. Artillery rounds (105 millimeter [mm]) have been found on and removed from the GRABS Site as recently as 2012.

When the Limited Test Ban Treaty of 1963 ended atmospheric nuclear testing, the United States and its allies embarked on a program to develop methods to simulate nuclear weapons effects. These simulations were necessary to meet the requirements to develop high confidence assessments of the survivability/vulnerability (S/V) of existing and proposed strategic and tactical systems. This testing was expanded to include simulating WMD effects following the events of 11 September 2001.

The GRABS Site is used to conduct scientific assessments of the S/V of hardened systems (e.g., structures, equipment, vehicles) to the blast and shock effects of nuclear and conventional weapons, as well as WMD. Research systems located on the GRABS Site include, but are not limited to: GRABS; 20-foot shock tube and associated buildings; shallow water shock tank; half-space apparatus; concrete tunnel test area; and a concrete test structure. Each is discussed in **Section 1.1.5** and shown in **Figure 3**.

Scaled high explosive (HE) field testing is an effective real-world means to evaluate the accuracy of scientific calculations and theories related to the blast and shock environment and impacts on hardened, protective structures and equipment. Field testing provides a reference point for, and validation of, both pre- and post-test predictions (simulation models). Taken together, several field tests provide a database against which future computations, designs, and assessments of similar structures, equipment, and geological settings may be evaluated.

Most of the testing at the GRABS Site involves the design, analysis, and testing of structures, new equipment, and explosives. The types of structures involved may include personnel protective structures, missile silos, bunkers, aircraft hangars, antennas, and tunnels. Most of the onsite test structures are removed upon completion of testing. DTRA may remove other, existing onsite equipment (i.e., smaller test articles, half-space apparatus, etc.) as this equipment becomes obsolete. The testing phase of the investigation involves the use of explosives and depends upon a suitable test site. The GRABS Site meets DTRA's operational requirements for a variety of research systems.

DTRA customers that use the GRABS Site include multiple DOD agencies, the National Nuclear Security Administration, the Department of Homeland Security, the Domestic Nuclear Detection Office, various national research laboratories, and government contractors. The generally open nature of the GRABS Site allows for substantial testing flexibility.

### **1.1.5 Existing GRABS Site Features and Activities**

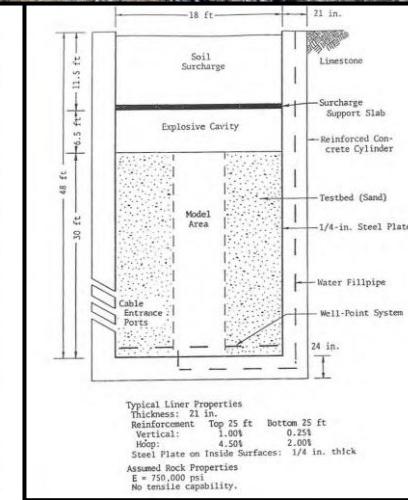
Various test structures are used and activities conducted at the GRABS Site. The schedule of use is sporadic and depends on customer needs, but is scheduled and planned well in advance. The GRABS Site is only staffed during test events, when as many as 30 personnel may be onsite, including up to 12 vehicles; all vehicles and personnel are required to stay on roads at appropriate, safe distances during test events. Annually, approximately 20 test events occur at the GRABS Site, with each explosive test event lasting, on average, 4 days. During non-testing periods, the Site is not staffed.

The following provides a discussion of the various test structures, features, and activities currently conducted at the GRABS Site. The information presented below is based on the information contained in Sections 1.2.2.1 through 1.2.4.6 of the 1993 EA prepared for the GRABS Site (Defense Nuclear Agency 1993; see Section 1.1.2), as updated to reflect current terminology and Site use/conditions.

### 1.1.5.1 GRABS Silo

The GRABS silo was constructed in 1971 by the Air Force Weapons Laboratory to conduct HE air blast simulation testing of Intercontinental Ballistic Missile system structures. The use of the GRABS silo has been intermittent from 1971 to the present, with the last major program being conducted between 1980 and 1982.

The GRABS silo measures 18 feet in diameter by 48 feet deep and is constructed in a massive limestone formation<sup>4</sup>. The GRABS silo is located in the center of the GRABS Site (see **Figure 3**). The GRABS silo is lined with 21-inch thick reinforced concrete designed to contain, with the help of the rock, the detonation of a NEW of up to 1,130 pounds. The operational concept of an experiment at the GRABS silo is as follows: (1) a soil test bed, approximately 30 feet deep, is compacted in the bottom of the GRABS silo; in some cases, the test bed also contains structural models; (2) an HE matrix is placed in an explosion chamber above the test bed, and 12 to 14 feet of soil overburden is placed above the explosive chamber; (3) the explosive (primacord) is detonated by a high voltage firing system; (4) upon detonation, the soil overburden initially acts to contain the explosion, but is quickly propelled out of the silo by the high pressures generated in the explosive chamber; and (5) instrumentation is used to measure and record the required experimental test data.



### 1.1.5.2 Shock Tube

Shock tube testing has been a component of the DTRA's testing mission since the early 1960s. A shock tube is a device for generating gas flows of very short duration. In its simplest form, it consists of a tube of constant cross section in which a diaphragm initially separates two bodies of gases at different pressures. Rapid removal of the diaphragm generates a flow of short duration that contains waves of finite amplitude separated by quasi-steady regions; this generates a wide range of flow temperatures. One important application of the shock tube has been the study of gases under extreme temperature conditions and their relationship to the S/V of structures and sensitive equipment.

The components of a shock tube test consist of the shock tube itself, an instrumentation van, and associated instruments. The shock tube contains driver and test station sections. The driver sections are designed for the installation and detonation of explosives, and thus have thicker

<sup>4</sup> DTRA also conducts testing in this limestone formation around the GRABS silo and the onsite shock tube to measure impacts on rock strength, and to test new sensors and equipment.

walls. The type, charge mass, and configuration of the explosives determine the characteristics of the air blast wave at the test article location. The floors of the driver sections are concrete, overlaid with steel plates. Viewports in the test station sections provide ports for high-speed photography.

Attached to, or near, the shock tube is a variety of small support structures for housing photographic or other instrumentation. A manifold system adjacent to the tube provides for gas-filling operations. Instrumentation is installed in the tube as needed. Signal lines in the tube are ported through the tube bottom to a cable tray parallel to the tube. Data are recorded in an instrumentation van located away from the tube.

#### 1.1.5.3 20-foot Shock Tube (HST-20).

The HST-20, located at the GRABS Site, was constructed during the fall of 1984 (see **Figure 3**). The HST-20 has been gutted and only the concrete tube remains; it has not been used as a shock tube since 1998. The purpose of this shock tube was replaced by the construction of the Large Blast Thermo Simulator at White Sands Missile Range.



The HST-20 was a large air blast simulator that is constructed of steel and is 20 feet in diameter and 825 feet long. The shock tube is open on each end. Currently, the HST-20 is used for testing experiments involving pressure and other tests that need to be performed under cover. As shown in the photographs, the HST-20 is currently empty.

The maximum explosive charge used in the past to provide the desired air blast simulation in the HST-20 has been a NEW of 2,000 pounds. Based on an explosive safety analysis performed in 1993, the maximum charge allowed in the HST-20 was reduced to a NEW of 900 pounds. As stated above, the HST-20 was last used as a shock tube in 1998.



#### 1.1.5.4 Shallow Water Shock Tank

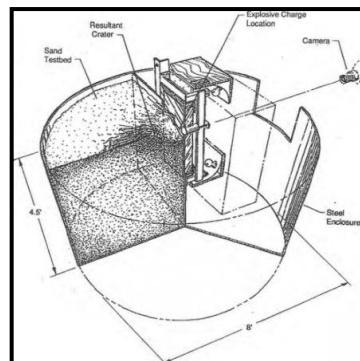


The Shallow Water Shock Tank is used as an HE environment for shallow water pressure effects simulation testing on a small scale. The Shallow Water Shock Tank was constructed in 1989 and was used extensively until 1990. The Shallow Water Shock Tank is a 7.5-foot diameter steel tank, 5.3 feet high with a removable lid, capable of holding approximately 1,750 gallons of water (see **Figure 3**). The tank is designed for 1,380 kilopascals (kPa) (200 pounds per square inch [psi]) operating pressure. The maximum explosive charge used in the Shallow Water Shock Tank has been a NEW of 0.14 pound with a 35-foot safety zone. After completing Shallow Water Shock Tank tests, water samples are collected from the tank and analyzed for explosives residue prior to disposal. If the water is found to contain contaminants, it is disposed of according to applicable regulatory requirements. Prior to any water release, all applicable discharge permits are obtained, as well as obtaining USAF approval.

### 1.1.5.5 Half-Space Apparatus



The Half-Space Apparatus is designed to provide a sectional view of the subsurface test bed motion field caused by the detonation of small-scale explosive charges. High-speed cameras provide a permanent record of the motion fields. The high-speed record of the motion fields can be used to investigate several areas of interest, such as crater mechanics, structure/crater interaction, and material properties.



The Half-Space Apparatus consists of an open-topped cylinder made of 3/8-inch thick A36 steel; it is 4.5 feet tall and 8 feet in diameter (see **Figure 3**). A reinforced and braced steel partition vertically divides the cylinder; the sand test bed is contained in one half of the vessel by the partition. A 2 by 3 foot viewport is built into the steel partition to allow high-speed photographic documentation. The apparatus sits on top of a concrete foundation. The Half-Space Apparatus has a 35-foot safety zone. The maximum explosive charge used in the Half-Space Apparatus is a NEW of 1 pound. The maximum range of ejecta from the apparatus during any test is less than 200 feet, with an overpressure at the 35 foot range of less than 1.7 kPa (0.25 psi).

### 1.1.5.6 Concrete Tunnel and Concrete Structure Test Area

Located in the southwestern portion of the GRABS Site, these structures are used for explosives testing within a structure or tunnel environment (see **Figure 3**).

**Concrete Tunnel Test Area.** In 2010, DTRA constructed the concrete tunnel at the GRABS Site as part of an ongoing testing program. The purpose of the tunnel is to test the near miss lethality of various explosives on pre-fabricated D-ring bunkers. The D-ring tunnel is constructed of replaceable sections to allow for multiple tests. The partially buried structure, used for up to 8 test events per year, is 9 feet tall and approximately 30 feet long. Adjacent bunkers and berms contain simulated equipment that helps to analyze blast damage. During the test, up to a NEW of 130 pounds, typically in scaled pipe bombs, is detonated to analyze the structure's response to various "near miss" events (DTRA 2010, DTRA 2012a). This structure will be removed upon the completion of the test activity, allowing the area to be reused for new test events.



**Concrete Structure Test Area.** In 2008, DTRA constructed this concrete structure to test the ability of explosive storage designs to withstand unplanned detonations. A NEW of up to 144 pounds is used to test the S/V of various thicknesses of concrete walls and slabs (DTRA 2008). This structure will be removed upon the completion of the test activity, allowing the area to be reused for new test events.



#### 1.1.5.7 Other Miscellaneous Onsite Structures

As shown in **Figure 3**, various other miscellaneous structures are located on the GRABS Site. These include a reinforced equipment shelter adjacent to the east of the HST-20, a solar/propane generator, a portable latrine, two observation stands on the western and southern site boundaries, a pair of telephone poles (used for testing) adjacent to the GRABS, and an overhead electrical line that terminates in the eastern portion of the Site.



The GRABS Site does not have a water supply, connected electric service, telephone service, or wastewater/sanitary sewer/septic system facilities. Two-way radios are used to maintain communication between the GRABS Site and other locations.



#### 1.1.5.8 GRABS Site Test Activities and Methods

The following testing (and training) activities and methods are conducted periodically at the GRABS Site. Training activities are related to equipment or procedures utilized for DTRA test activities. These activities are generally conducted throughout the southern section of the GRABS Site and include the existing onsite structures. Effectively, any portion of the GRABS Site south of

Target Road can be used for such events, in accordance with applicable and site and test specific health and safety analyses and plans. The portion of the GRABS Site north of Target Road is not used for test events; this portion of the GRABS Site is used for cameras and other sensor monitoring purposes only.

**High Explosive Testing.** Explosive testing on the Site initially supported simulated tests related to the Limited Test Ban Treaty of 1963. Current explosive tests involve scaled and non-scaled building tests, development of new explosives and detonation techniques, and the use of explosives to create shock and blast waves. Most explosives testing at the GRABS Site is performed in a structure or with buried explosives. Fragmenting<sup>5</sup> explosives can only be used at the GRABS Site if they are buried.

The following provides a brief description of the various types of typical HE simulation tests that are conducted at the GRABS Site.

- **Scaled and Non-scaled Building Tests.** These tests measure the impact of explosives on scaled buildings or full-size building sections. The data from these survivability tests are used to improve military and civilian facility designs. Buried and aboveground structures are evaluated, utilizing aboveground, ground-level, and buried explosives.
- **Development and Testing of New Explosives.** These tests are conducted to determine the detonation characteristics of proposed new HE types, charge configurations, or new detonation techniques. New explosive mixtures or detonators are tested for explosive power, safety, and reliability. This work may be done in an open area, within a structure, or buried. Initial tests usually utilize less than 10 pounds of explosive, but may be increased during a test program. The maximum surface charge equivalent is a NEW of 900 pounds.
- **Explosives to Create Shock and Blast Waves.** Shock and blast wave experiments are commonly used to check the ability of equipment or sensors to withstand explosive blasts or to obtain basic blast and shock impact measurements (i.e., air blast, crater, ejecta, and/or ground motion from either surface or buried charges). These experiments also measure shock waves through the existing limestone or alluvium located on the GRABS Site.
- **Instrumentation Development Tests.** These tests use explosives to evaluate new instrumentation techniques for measuring blast and shock parameters (e.g., soil stress, particle motions, air blast peak, strains of structural models, and environmental impacts). Explosives are used to launch dust or water particles into the air to create an environment for new sensor testing.
- **Non-Explosive Tests.** Non-explosive tests are used to develop or test non-blast-related sensors. These sensors may collect air samples, measure various parts of the non-visual spectrum (e.g., infrared/ultraviolet), or measure other, non-blast-related characteristics. The majority of these are non-emitting, passive instruments or sensors. Some of these sensors are hung from balloons to provide a vertical collection system. Testing of small-scale drilling equipment and low frequency tests may occur in appropriate areas of the GRABS Site. There are numerous types of non-explosive tests that do and could take place on the GRABS Site; this list is not all inclusive.

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<sup>5</sup> Fragmenting explosives or weapons are encased in steel, which fragments upon detonation (e.g., a hand grenade). Non-fragmenting explosives or weapons are encased in cardboard, plastic, or other material that disintegrates or burns upon detonation.

### 1.1.5.9 Use of High Explosives at the GRABS Site

**Explosives Safety.** Explosive materials use and handling at the GRABS Site are performed in accordance with DOD and Occupational Safety and Health Administration (OSHA) Standards (29 CFR §1910.109), and are monitored by a DTRA Certified Explosives Safety Officer. Following arrival of explosives at the GRABS Site, 24 hour per day security is maintained until the explosives are detonated. No explosives are stored permanently at the GRABS Site; explosives are brought to the Site in advance of each test event, and only in the quantities necessary to support the test.

**Site-Specific Health and Safety Plans and Analyses.** DTRA follows and implements existing HASPs, including the GRABS ESP and the site-specific HASRA, for all activities at the GRABS Site. Both plans are presented in their entirety in **Appendix B** and summarized below.

- **Explosive Site Plan.** The Department of Defense Explosives Safety Board (DDESB) approved the current GRABS ESP on 31 August 2010. The ESP establishes NEW limits for both non-fragmenting and fragmenting explosives at the Site; DTRA complies with these limits during each test event. In accordance with the ESP, the location limits for each NEW (500 pounds [green], 700 pounds [amber], and 900 pounds [red]) are shown in **Figure 4**. The ESP also requires that concurrent testing operations not be conducted at the GRABS Site and that roads be closed to unrelated personnel during each explosives test event. This ESP recognizes and incorporates the sensitivity of the Isleta Pueblo Indian Reservation located immediately to the south of Kirtland AFB, as well as various facilities and structures located nearby (DDESB 2010).



**Figure 4. Net Explosive Weight Limit Locations at the GRABS Site per the Explosives Site Plan**

- **Health and Safety Risk Analysis.** The DTRA Test Safety Manager approved the GRABS site-specific HASRA on 14 November 2012. The HASRA identifies all potential health and safety risks at the GRABS Site, and sets forth specific measures for each risk to minimize the risk to acceptable levels during each test event (DTRA 2012b).
- **Other Measures.** In accordance with the HASRA, all personnel visiting the GRABS Site must first obtain a required safety brief that identifies and discusses Site risks, including the potential for UXO (see **Section 1.1.4**). Additionally, prior to conducting any test event, a test-specific Standard Operating Procedure (SOP), which includes a test-specific HASP, is developed, approved by DTRA, and implemented. A sample SOP for a previous test conducted in 2010 is provided in **Appendix B**. An individualized HASP is developed for each test activity using the GRABS Site.

**Fugitive Dust Control.** Test events at the GRABS Site periodically require the movement of onsite soil from one location to another (e.g., to create berms or soil overburdens over test locations), as well as require various other forms of minor earth disturbance. No soil is brought to the Site or removed from the Site to other locations. In accordance with 20.11.20 New Mexico Administrative Code (NMAC), the GRABS Site operates under Fugitive Dust Control Programmatic Permit #P12-0007 issued by the Albuquerque Environmental Health Department - Air Quality Division (AEHD-AQD). The AEHD-AQD issued this permit on 28 September 2011 (AEHD-AQD 2011; see **Appendix C**). The permit covers routine maintenance and routine ongoing active operations on the GRABS Site to support the testing mission. This permit is valid for 5 years and allows up to 5 acres of soil disturbance at the GRABS Site at any given time. Please refer to **Appendix C** for more information.

**Open Burn.** Test events at the GRABS Site must be permitted under the AEHD-AQD Open Burn Program. Per 20.11.21 NMAC, an Open Burn Permit is required annually for above- or below-ground detonations of more than 20 pounds of explosives. An Open Burn Permit #14-0001, issued 17 December 2013, conditionally approves Kirtland AFB and its tenants to conduct explosive tests using up to 2,000 pounds of explosives for the time period beginning 1 January 2014 and ending 31 December 2014. The permit can be found in **Appendix C**. The conditions placed on the authorized activities include:

- 1) The open burn or detonation will be conducted in the manner stated and at the following location: Kirtland AFB as indicated in the application dated 12 December 2013 and received by the AEHD-AQD.
- 2) Every reasonable effort will be made to minimize air contaminants.
- 3) As required by 20.11.21.200.A(4) NMAC and 20.11.21.200.D NMAC, this permit will be suspended during a “no burn” period, or in the event of current or prospective exceedances of the federal ambient air quality standards as determined by the Director of the City Environmental Health Department.
- 4) At least 24 hours prior to the anticipated open burn or detonation, fax a notice and send an email to AEHD-AQD. If unforeseen or emergency conditions dictate that a less than 24-hour notification is required, still notify AEHD-AQD and provide the following information:
  - a. Company or agency name
  - b. Contact name and phone number
  - c. Type of activity
  - d. Permit number
  - e. Anticipated date and times for the open burn or detonation or cancellation of the permitted activity, if notification was made
  - f. Anticipated duration of the burn

- 5) In accordance with 20.11.21.12 NMAC, burning of environmentally poor burning substances, as defined in 20.11.21.7.K NMAC, is strictly prohibited in Bernalillo County.

**Noise and Vibration Monitoring.** Prior to conducting any explosives test at the GRABS Site, DTRA monitors wind and weather conditions to ensure noise, sound pressures, and vibrations generated by test activities would not affect other facilities or locations on or off of Kirtland AFB, including the Isleta Pueblo Indian Reservation. DTRA coordinates with nearby on-installation facilities well in advance of each test to ensure proper planning. During each test, DTRA monitors noise and sound pressures generated to ensure they are consistent with pre-test predictions. Other safety measures include closing Target Road during test events, as necessary.

The Noise Management Plan presented in **Appendix B** provides a description of the methods DTRA uses to ensure no significant off-installation noise and vibration impacts occur during explosives test events, following the Federal Office of Surface Mining and Reclamation Enforcement regulations for surface coal mine blasting. Through implementation of the procedures described in **Appendix B**, DTRA and Kirtland AFB have received no noise or vibration complaints from GRABS Site testing activities since the development of the GRABS in 1971.

**High Explosives Types.** A variety of HE explosive types are used in simulation tests. The explosive type is chosen for each test event based on performance factors, ease of installation, safety, and cost. The following provides a brief description of the typical types of explosives that are used at the GRABS Site.

- Ammonium Nitrate-Fuel Oil: Ammonium Nitrate-Fuel Oil (ANFO) consists of ammonium nitrate (fertilizer) mixed with approximately 5.5 percent (by weight) fuel oil. ANFO is usually packaged in 50- or 100-pound paper/plastic bags, or can be delivered in bulk form in containers. ANFO, a very insensitive blasting agent, requires a booster for detonation.
- Emulsion Explosives: Emulsified mixtures of nitrate salts (molten or in solution) with fuels (typically fuel oil or mineral oil) are used. Emulsion explosives are normally packaged in 6-inch diameter cylindrical plastic bags, weighing approximately 25 pounds each. Initiation of emulsion explosives also requires a booster.
- Pentaerythritol tetranitrate: Pentaerythritol tetranitrate (PETN) is a standard detonating cord (primacord) used as a booster and for firing lines in all the research systems. PETN is also used in some of the test events as the primary explosive. PETN is a moderately sensitive explosive that may be detonated with a standard blasting cap.
- Trinitrotoluene: The "standard" of explosives, trinitrotoluene (TNT) is available in cast spheres, blocks, and hemispheres of various masses. TNT is a moderately sensitive explosive that requires a booster for detonation.
- Pentolite: Pentolite is a castable, solid, military and commercial explosive composed of PETN and TNT. Pentolite is normally used as a booster for ANFO and TNT detonations.
- Composite 4: Composite 4 (C-4) is a plastic, solid, military explosive used extensively in military applications. C-4 is used mainly as a booster.
- Nitromethane: Nitromethane is an insensitive, clear, liquid explosive that requires a booster for initiation. Nitromethane is normally contained in fiberglass for use in certain simulation tests.
- Exploding Bridgewire Detonators: Exploding Bridgewire Detonators is a high voltage, extremely insensitive detonator used for the initiation of all boosters and PETN firing lines.

**Balloon Monitoring.** Balloons are sometimes used to hang sensors to collect test data after a test event at the GRABS Site. The GRABS Site is used at times to train operators in the use of the balloons.

### 1.1.6 Environmental Assessment Organization

This EA is organized into six sections and seven appendices. **Section 1** states the purpose, need, scope, and public involvement efforts for the Proposed Action. **Section 2** contains a detailed description of the Proposed Action and the alternatives considered. **Section 3** describes the existing conditions of the potentially affected environment. **Section 4** identifies the environmental consequences (impacts) of implementing all reasonable alternatives, including direct, indirect, and cumulative impacts. **Section 5** provides the names of the individuals who participated in the preparation of this EA. **Section 6** lists the references used to support the analyses.

## 1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to enhance and support the ongoing and future testing and training mission and capabilities of DTRA and the GRABS Site, as described in **Sections 1.1.3** through **1.1.5**. The Proposed Action is needed to ensure the GRABS Site continues to effectively support DTRA's current and future testing mission requirements, while minimizing environmental impacts.

## 1.3 Scope of the Environmental Assessment

Scope consists of the range of actions, alternatives, and impacts to be considered. The scope of the Proposed Action and the range of alternatives to be considered are presented in detail in **Section 2**. In accordance with CEQ regulations implementing NEPA (40 CFR Parts 1500–1508), the No Action Alternative is analyzed to provide the baseline against which the environmental impacts of implementing the range of alternatives addressed can be compared. This EA identifies appropriate mitigation measures that are not already included in the Proposed Action or alternatives in order to avoid, minimize, reduce, or compensate for adverse environmental impacts.

The EA examines the environmental impacts of the Proposed Action and No Action Alternative on the following resource areas: noise, visual resources, air quality, geology and soils, water resources, biological resources, cultural resources, transportation and infrastructure, hazardous materials and waste, safety, and socioeconomics and environmental justice. The characterization of the affected environment, or baseline environmental conditions, is discussed in **Section 3**; however, per CEQ regulations (40 CFR §1501.7 [a][3]), only those resource areas that apply to the Proposed Action are analyzed. As such, and because implementation of the Proposed Action would not alter the existing use of the GRABS Site or the surrounding area, land use is not analyzed within this EA. An analysis of potential direct, indirect, and cumulative impacts on Kirtland AFB associated with the Proposed Action and No Action Alternative is presented in **Section 4**.

### 1.3.1 Environmental Laws, Regulations, and Executive Orders

To comply with NEPA (Public Law 91-190, 42 USC §§4321 *et seq.*), the federal planning and decision-making process involves a study of other relevant environmental laws, regulations, and Executive Orders (EOs). The NEPA process does not replace procedural or substantive requirements of other environmental laws; it addresses them collectively in an analysis, which enables decision-makers to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the

requirements of NEPA must be integrated “with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively” (40 CFR §1500.2). As required in 40 CFR §1500.2(c), this EA contains a list of federal permits, licenses, and coordination that might be required in implementing the Proposed Action or alternatives (**Table 1**).

**Table 1. Sample List of Coordination and Permits Associated with the Proposed Action**

Agency	Permit/Approval/Condition
<b>U.S. Fish and Wildlife Service (USFWS)</b>	<ul style="list-style-type: none"> <li>• Endangered Species Act (ESA) Section 7 Coordination</li> <li>• Migratory Bird Treaty Act (MBTA) Coordination</li> </ul>
<b>U.S. Environmental Protection Agency (USEPA)</b>	<ul style="list-style-type: none"> <li>• National Pollutant Discharge Elimination System (NPDES) permit</li> </ul>
<b>AEHD-AQD</b>	<ul style="list-style-type: none"> <li>• Applicable air quality permit(s)</li> <li>• 20.11.20 NMAC, Fugitive Dust Control</li> <li>• 20.11.21 NMAC, Open Burn Program</li> <li>• 20.11.40 NMAC, Source Registration</li> <li>• 20.11.41 NMAC, Construction Permits</li> </ul>
<b>New Mexico Historic Preservation Division</b>	<ul style="list-style-type: none"> <li>• National Historic Preservation Act (NHPA) Section 106 Consultation</li> </ul>

**Appendix D** contains summaries of the environmental laws, regulations, and EO's that might apply to this Proposed Action. Where relevant, these laws are described in more detail in the appropriate resource areas presented in **Section 3** of the EA. The scope of the analysis of potential environmental consequences in **Section 4** considers direct, indirect, and cumulative impacts.

#### 1.4 Interagency Coordination and Public Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of federal decisions would be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require federal agencies to cooperate with and consider state and local views in implementing a federal proposal. The USAF implements an agency coordination process, which is used for facilitating and receiving agency input coordination and implements scoping requirements.

Scoping letters were provided to relevant federal, state, and local agencies and Native American tribes notifying them that DTRA and the USAF are preparing an EA to evaluate potential impacts of implementing the Proposed Action at the existing GRABS Site. The agencies and tribes were requested to provide information regarding impacts of the Proposed Action to the natural environment or other environmental aspects that they felt should be included and considered in the preparation of this EA. Five responses from government agencies (State Historic Preservation Office [SHPO], Mid-Region Council of Governments, New Mexico Department of Game and Fish [NMDGF], U.S. Forest Service, and Bernalillo County Parks and Recreation Department) were received during the scoping process. All responses from government agencies stated they had no concerns with the Proposed Action. One response was also received from the Pueblo of Isleta, Governor's Office requesting a meeting to determine if any potential impacts to Tribal Lands exist. The meeting was held on 1 May 2013. The Tribal Liaisons requested a copy of the Description of

the Proposed Action and Alternatives (DOPAA) once it was prepared. DTRA and the USAF provided a copy of the DOPAA and no comments were received. All interagency coordination, tribal consultation, and public involvement materials related to the scoping process of this EA, to include a listing of all agencies, tribes, and other stakeholders contacted, are included in **Appendix E**.

Through the interagency and intergovernmental coordination process, DTRA and the USAF provided the Draft EA to relevant federal, state, and local agencies to share the analyses of the Proposed Action and alternatives and provide them sufficient time to make known their environmental concerns specific to the action. The interagency coordination process also provided Kirtland AFB with the opportunity to cooperate with and consider state and local views in implementing the federal proposal. Native American tribes were also notified of the Proposed Action, and provided an opportunity to comment on the Proposed Action. Three responses from government agencies (U.S. Forest Service, Mid-Region Council of Governments, and the New Mexico Environment Department [NMED]) and one response from the Navajo Nation were received during the interagency and intergovernmental coordination process. All responses from government and tribal agencies stated they had no concerns with the Proposed Action. All interagency coordination, tribal consultation, and public involvement materials related to this EA are included in **Appendix E**. A listing of the agencies, tribes, and other stakeholders that were contacted is provided in **Appendix E**.

A Notice of Availability (NOA) for the Draft EA was published in *The Albuquerque Journal*, and the Draft EA was made available for the public for a 30-day review period from 30 October to 28 November 2014. The NOA was issued to solicit comments on the Proposed Action and involve the local community in the decisionmaking process. On 24 November 2014, a representative from the San Felipe Tribe contacted Kirtland AFB requesting an additional 30 days to review and comment on the Draft EA. This extended the comment period to 28 December 2014. Comments received from the public and other federal, state, and local agencies were addressed in the EA, where applicable.

## 2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

### 2.1 Introduction

As discussed in **Section 1.1**, the NEPA process provides for an evaluation of potential environmental consequences (impacts) associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for the Proposed Action, as defined in **Section 1.2**. In addition, CEQ regulations also specify the inclusion of a No Action Alternative against which potential impacts of the Proposed Action (and reasonable alternatives) can be compared. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail in accordance with CEQ regulations (40 CFR §1502.14).

### 2.2 Proposed Action

DTRA, working with the USAF, is proposing to continue ongoing explosive test events at the GRABS Site as described in **Section 1.1.5**, and fully analyzed within the 1993 EA, as well as to conduct additional, enhanced testing activities in accordance with their current and emerging mission requirements. The mission of DTRA and the GRABS Site are discussed in **Sections 1.1.3** and **1.1.4**. Proposed new and emerging mission testing requirements are discussed below.

#### 2.2.1 Proposed Testing Using a Biological Simulant at the GRABS Site

Biological simulants are “biological substances or microorganisms that share at least one physical or biological characteristic of a biological agent, have been shown to be nonpathogenic, and can be used for biological defense testing to replace the agent under study” (DTRA 2007). DTRA proposes to conduct testing at the GRABS Site using a biological simulant, as described below.

A biological simulant would be used at the GRABS Site to test and measure the spread and S/V of more dangerous biological agents during explosive events, without actually using dangerous agents. A biological simulant could also be used to test the ability of new sensors to detect these materials. These tests would only be conducted using non-harmful quantities of a biological simulant and, while the test would be open to the environment, would only be conducted when winds are from the south. This would control drift and ensure that the only possible spread of the biological simulant would occur within the boundary of Kirtland AFB. Since the biological simulant would not enter off site properties or populations, no public notification would be required. This testing event would occur approximately once every 2 years.

The proposed use of a biological simulant at the GRABS Site would include the use of a single simulant that would simulate a release of the bacterium *Bacillus anthracis*, the agent responsible for causing the disease Anthrax. The specific simulant DTRA proposes to use is *Bacillus thuringiensis kurstaki* (Btk), a naturally occurring aerobic bacterium closely related to *Bacillus anthracis*. Btk produces spores commonly used in agriculture as a commercial organic insecticide that primarily targets leaf- and needle-eating caterpillars, including cabbage worms, hornworms, leafrollers, tent caterpillars, European corn borers, and alfalfa caterpillars, among others (Colorado State University Extension 2008). Less than 10 pounds of this material would be used at any given time. This amount is slightly greater than the amount that an organic farmer would use for treating 2 acres of crops. By comparison, the GRABS Site is approximately 155 acres.

Under the Proposed Action, DTRA would place a quantity of Btk within a test structure, and then cause an explosion within that test structure. This explosion would simulate the destruction of an Anthrax-producing facility. DTRA personnel would then track the spread of Btk spores in the environment and determine the survivability of Btk spores throughout the event. Under the “worst

case scenario”, Btk would be spread over a maximum of 5 acres during a given test event. In addition to determining the impacts of a potential explosion within a facility containing *Bacillus anthracis*, this test offers valuable training opportunities in laboratory safety.

The proposed infrequent use of Btk at the GRABS Site would limit the amount of it released to the environment, but Btk is generally considered safe to all non-target species. As one of the first biological control agents registered for use against insects in the county, Btk had to undergo a very thorough USEPA testing program. These tests determined that it did not result in acute toxicity in birds, dogs, guinea pigs, mice, rats, humans, or other animals tested. The amount of a substance required to kill 50 percent of a test population (e.g., the lethal dose 50 percent, or LD<sub>50</sub>), is a common measurement of toxicity. No LD<sub>50</sub> exists for pure Btk, a further sign of its safety (see **Appendix F**). Use of Btk is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (see **Appendix D**).

## 2.2.2 Proposed Improved "Housekeeping"

Although historic onsite test events have been carefully controlled and monitored to produce no significant offsite impacts, housekeeping on the GRABS Site has been lacking. Non-harmful test materials and test-related debris (e.g., wiring, cabling, bags, plastic, etc.) are regularly left at the GRABS Site for extended periods of time.

To improve this onsite housekeeping issue, DTRA proposes to establish test bed clean-up dates for each test event during initial pre-test planning to ensure the affected portions of the GRABS Site are restored to current pre-test conditions as quickly as possible.



### 2.2.3 Test Structure Construction and De-Construction

No new major construction or de-construction is proposed. Existing onsite test structures would be used. Minor new test structures may be constructed from time to time, and ongoing periodic ground disturbance would occur, as currently conducted and permitted on the GRABS Site. No more than 5 acres of the GRABS Site would be disturbed at any one time, and all disturbances would occur south of Target Road. Typical minor construction would not exceed 1 acre.

To prepare for test events, equipment such as bulldozers, backhoes, front-end loaders, dump trucks, cranes, tractor-trailers, concrete mixers, and generators would continue to be used to support test site preparation. Vehicles would be checked for leaks prior to entering the GRABS Site, but if a fuel or oil spill occurred on site, the spill would be managed in accordance with the Hazardous Material Emergency Planning and Response Plan (Kirtland AFB 2008a). Sufficient amounts of fuels, hydraulic fluids, oils, and lubricants would be used on the GRABS Site during these preparations to support contractor vehicles and machinery. No hazardous materials would be stored on the Site; all materials would be transported to the Site in preparation for and during test events. All material needs would be supplied by offsite vendors; all structures involved in the Proposed Action are already onsite or would be brought to the Site and would be temporary in nature. Test preparation activities would require small amounts of electricity; however, no natural gas or steam would be required.

If a dust nuisance or hazard has the potential to occur during test site preparation, DTRA would supply water to be used for dust control and would comply with the existing Fugitive Dust Control Programmatic Permit #P12-0007 (see **Section 1.1.5.8** and **Appendix C**). Water would be applied by water trucks and sprayers.

Due to the limited amount of land disturbance that would occur during each test preparation activity (i.e., less than 1 acre), the Proposed Action would not require NPDES permit coverage or preparation of a Storm Water Pollution Prevention Plan (SWPPP)<sup>6</sup>. The GRABS Site is covered by Fugitive Dust Control Programmatic Permit #P12-0007 issued by the AEHD-AQD. The permit covers routine maintenance and routine ongoing operations on the GRABS Site to support the test mission.

Following each test activity, site restoration would include backfilling with existing soil from the Site and final grading of the disturbed areas to blend with surrounding areas. As stated in **Section 1.1.5.8**, no soil would be brought to or taken from the GRABS Site. Test structures would be removed from the GRABS Site following completion of the testing program.

### 2.2.4 Operation and Maintenance

The proposed specific activities and future test structures would be integrated into and enhance the GRABS Site testing and training missions. As with current testing operations and as described above, the test structures would be removed from the GRABS Site and the Site restored upon completion of the specific testing program. Maintenance activities would include general housekeeping activities performed in accordance with ongoing Site maintenance. No onsite vehicle maintenance is proposed.

## 2.3 Environmental Best Management Practices, Permits, and Approvals

Prior to the implementation of any component of the Proposed Action, DTRA would obtain all required federal, state, and local permits and approvals necessary to comply with applicable laws. In addition, DTRA would implement the Best Management Practices (BMPs), or Environmental

<sup>6</sup> Should a proposed construction activity exceed 1 acre, DTRA would comply with NPDES permitting requirements, and would prepare and implement a project-specific SWPPP (see **Table 12**).

Protection Measures, listed in **Table 12** as part of the Proposed Action. These include “mitigation by design” measures that are routinely incorporated into all DTRA projects at Kirtland AFB. These measures, incorporated as part of the Proposed Action, serve to proactively “mitigate” adverse environmental impacts. Implementation of these BMPs would serve to minimize impacts on specific areas of concern noted by agencies and Tribes during the scoping process (see **Appendix E**).

## 2.4 Site-Selection Criteria

In accordance with 32 CFR §989.8(c), the development of site-selection criteria is an effective mechanism for identifying, comparing, and evaluating reasonable alternatives. DTRA developed the following site-selection criteria to be consistent with the purpose of and need for the Proposed Action and to address pertinent mission, environmental, safety, and health factors. DTRA used the following site-selection criteria to identify reasonable alternatives for analysis in this EA:

- Provide a complete set of facilities under DTRA’s direct control that meet and support DTRA’s current and future testing and training mission. The proposed activities should not conflict with or limit existing, ongoing testing and training use of the property or adjacent properties.
- The property should be sufficiently remote so that explosive test activities do not adversely affect other existing on- or off-installation structures or facilities.
- As proposed activities complement ongoing activities at the DTRA’s GRABS Site, the Proposed Action should be located within the boundaries of the GRABS Site.
- The Proposed Action should provide a complete set of testing structures and activities to meet and support DTRA’s current and emerging testing and training mission needs at the GRABS Site. These include the potential to use existing onsite equipment and structures, as well as to conduct new testing activities.

## 2.5 No Action Alternative

Under the No Action Alternative, DTRA would not implement the components of the Proposed Action as described in **Section 2.2**. This would result in limiting onsite testing capabilities to historic levels, and would not allow DTRA to conduct new testing mission activities; this could compromise DTRA’s mission at the GRABS Site.

While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, this alternative was retained to provide a comparative baseline against which to analyze the impacts of the Action Alternatives, as required under CEQ regulations (40 CFR §1502.14). The No Action Alternative reflects the *status quo* and serves as a benchmark against which the impacts of the Proposed Action can be evaluated.

## 2.6 Alternatives Considered But Eliminated From Detailed Analysis

Alternatives initially considered included utilizing an alternative site controlled by DTRA on Kirtland AFB, relocating test activities to another installation, and a reduced scale (i.e., partial implementation) alternative.

### 2.6.1 Utilizing an Alternative Site on Kirtland AFB Controlled by DTRA

DTRA and the USAF considered the TEAMS, which is also controlled by DTRA, as a potential location for the Proposed Action. However, TEAMS is not located in a remote area of the installation and would introduce explosive testing in a heavily populated portion of the installation. Also, use of the TEAMS would result in increased construction costs and compromise the existing function of the TEAMS due to the introduction of explosives testing in the area.

Per the site-selection criteria, a reasonable site for the Proposed Action must be secure, already controlled by DTRA, located within Kirtland AFB, and sufficiently remote so that explosive test activities do not adversely affect other existing on- or off-installation structures or facilities. No other site within Kirtland AFB meets these criteria. Furthermore, the replacement or relocation of existing established GRABS assets, such as the GRABS silo, shock tube, 20-foot shock tube, shallow water tank, half-space apparatus, concrete tunnel and concrete structure test area, and other infrastructure would be cost prohibitive.

For these reasons, this alternative was eliminated from further consideration and is not analyzed in this EA.

### 2.6.2 Relocation of Test Activities to Another Installation

DTRA considered moving the test activities and structures associated with the GRABS Site to another installation, such as the White Sands Missile Range. However, relocation to another installation would result in increased costs and travel time, and would adversely affect the mission inter-relationship of the TEAMS and Chestnut Site test and training activities at Kirtland AFB. Existing test structures, currently at the GRABS Site, would need to be relocated. Acquiring another suitable site would require additional time and monies, and it is uncertain as to whether such a suitable site is actually available for dedicated explosives test activities for DTRA and their mission. As such, this alternative was eliminated from further consideration and analysis in this EA.

### 2.6.3 Reduced-Scale (Partial Implementation) Alternative

Under this alternative, DTRA would implement only a partial set of the Proposed Action components. However, failure to implement any component would result in mission shortfalls as identified in **Section 1.2**. DTRA determined that implementation of the reduced-scale alternative would not meet the site-selection criteria of meeting current and future mission requirements at the GRABS Site. Therefore, this alternative was not carried forward for further detailed analysis in this EA.

## 2.7 Comparative Summary of Impacts

**Table 2** presents a summary of potential impacts resulting from the Proposed Action and the No Action Alternative categorized by resource area. This EA addresses these impacts in more detail within **Section 4**.

**Table 2. Summary of Potential Impacts of the Proposed Action and the No Action Alternative**

Resource Area	Proposed Action	No Action Alternative
Noise	<p>While construction activities would result in short-term increases to the existing noise environment, these impacts would be negligible and temporary in nature, and generally not audible to any off-installation area.</p> <p>The proposed use of a biological simulant would introduce a new form of testing and training to the Site, but the noise created by each test event, conducted once every 2 years, would be similar to that created by ongoing test events; no additional noise impacts would be expected.</p>	<p>Operations would continue at the GRABS Site as currently conducted, and the ambient noise environment would not change from existing conditions. Current and historic testing activities at the Site have not resulted in any noise complaints. Therefore, no adverse impacts on noise are anticipated to occur.</p>

**Table 2. Summary of Potential Impacts of the Proposed Action and the No Action Alternative (continued)**

Resource Area	Proposed Action	No Action Alternative
<b>Visual Resources</b>	<p>Construction activities at the GRABS Site would increase the number of associated equipment, vehicles, and materials. However, any potential impacts would be short-term and temporary in nature and consistent with installation construction practices. Therefore, only negligible impacts would be anticipated.</p> <p>Periodic use of balloons during test events would continue to result in minimal, short-term, adverse impacts.</p> <p>The Proposed Action includes improved “housekeeping” activities, which would result in long-term, beneficial impacts and improve the general aesthetics of the GRABS Site.</p>	<p>No change to the installation’s current aesthetic appearance would occur.</p> <p>The potential long-term, beneficial impact of implementing the improved “housekeeping” practices would not occur, resulting in an adverse impact on visual resources.</p>
<b>Air Quality</b>	<p>Construction activities at the GRABS Site would generate air emissions during ground-disturbing activities and operation of construction equipment and trucks. However, such impacts would be short-term and temporary in nature and less-than-significant, as emission amounts would be below designated <i>de minimis</i> thresholds.</p> <p>The proposed use of a biological simulant would only occur when winds are from the south; ensuring off-installation areas are not affected.</p> <p>Potential impacts from fugitive dust during construction, de-construction, and test activities would be less than significant due to the small area of proposed disturbance and compliance with existing fugitive dust and open burn permits.</p>	<p>Existing air emissions from construction activities and explosives test events at the GRABS Site would continue, as permitted under existing air quality permits. No change to the local or regional air quality environment would occur.</p>
<b>Geology and Soils</b>	<p>Short-term, less-than-significant, adverse impacts may occur during proposed construction, de-construction, and test activities. Impacts could arise from loss of vegetation, increased erosion and sedimentation, trenching, grading, and re-contouring. However, continued compliance with the 2012 CGP would reduce these impacts.</p> <p>The proposed use of a biological simulant would not require any ground disturbance; therefore, no impacts are expected.</p> <p>The Proposed Action includes improved “housekeeping” activities, which would result in long-term, beneficial impacts.</p>	<p>No changes to existing geology and soil conditions would occur.</p> <p>The potential long-term, beneficial impact through improved “housekeeping” practices would not occur.</p>
<b>Water Resources</b>	<p>While groundwater resources may be used for dust suppression during construction activities, current annual water use at Kirtland AFB is well below the limit allowed. Therefore, a less-than-significant, adverse impact would be anticipated.</p>	<p>The existing condition of onsite water resources would continue. Implementation of the No Action Alternative would not result in any new or additional impacts on local or regional water resources.</p>

**Table 2. Summary of Potential Impacts of the Proposed Action and the No Action Alternative (continued)**

<b>Resource Area</b>	<b>Proposed Action</b>	<b>No Action Alternative</b>
<b>Water Resources (continued)</b>	<p>As a soil bacterium, Btk does not readily percolate through the soil into groundwater. Therefore, no adverse impacts on groundwater quality or surface water would be anticipated.</p> <p>Short-term, less-than-significant, adverse impacts on surface waters would result from ground-disturbing construction and test activities potentially increasing storm water discharge and sedimentation. However, compliance with all permits and BMPs would reduce this impact.</p>	
<b>Biological Resources</b>	<p>Construction, de-construction, and test activities associated with the Proposed Action would result in short-term, less-than-significant, adverse impacts on vegetation within proposed construction and test event footprints.</p> <p>Because Btk is a naturally-occurring soil bacterium, existing onsite vegetation and wildlife is routinely exposed to Btk. Test events using this biological simulant would not be expected to have an adverse impact.</p> <p>Noise impacts on wildlife associated with periodic, small-scale construction and explosive test events under the Proposed Action are anticipated to be negligible and consistent with ongoing activities. No adverse impacts on local wildlife species or their habitat has been documented.</p> <p>The Proposed Action includes improved “housekeeping” activities, which would result in long-term, beneficial impacts by eliminating potential nesting locations at the Site.</p>	<p>Existing conditions of biological resources within the GRABS Site would remain unchanged over current conditions.</p> <p>The potential beneficial impact associated with improved “housekeeping” would not occur.</p>
<b>Cultural Resources</b>	<p>One NRHP-eligible site exists within the Area of Potential Effect (APE); however, because the Proposed Action is a continuation of existing activities that have occurred on the Site for over 40 years, this property would not be adversely impacted.</p> <p>An archaeological survey of the Site was conducted in 1993 and recommended clearance of the Site. Therefore, no impacts are anticipated.</p>	<p>Existing cultural resources conditions would remain the same. No adverse impacts would be expected.</p>
<b>Infrastructure</b>	<p>Short-term, less-than-significant, adverse impacts on transportation, the water system, storm water systems, and solid waste management may occur during construction and test activities due to increased traffic, ground disturbance, and the generation of construction waste. However, compliance with the 2012 CGP and diversion of reusable and recyclable materials would reduce these impacts.</p>	<p>Existing infrastructure would remain unchanged from current conditions. No additional impacts would occur at the Site or within the vicinity.</p>

**Table 2. Summary of Potential Impacts of the Proposed Action and the No Action Alternative (continued)**

<b>Resource Area</b>	<b>Proposed Action</b>	<b>No Action Alternative</b>
<b>Hazardous Materials and Waste</b>	<p>Construction and de-construction activities associated with the Proposed Action would result in short-term, less-than-significant, adverse impacts due to an incremental increase in hazardous materials and wastes. Adherence to the Environmental Management System (EMS) Program and associated installation plans would minimize these impacts.</p> <p>Test events using explosives and Btk would result in less-than-significant, adverse impacts on the hazardous materials program. Detonation products released during explosive tests are naturally-occurring substances, and products resulting from reactions with the atmosphere are natural and non-hazardous. Btk, a naturally-occurring soil bacterium and is not considered a hazardous material or toxic substance.</p> <p>Portions of the Site are located within an active SNL Environmental Restoration (ER) site; however, DTRA does not conduct test events in this area. Therefore, no impacts are anticipated.</p>	<p>Existing conditions would remain unchanged. No additional impacts are expected.</p>
<b>Safety</b>	<p>During construction and de-construction activities, less-than-significant, adverse impacts on contractor safety may occur due to the increased level of activity in the area. However, continued implementation of health and safety programs would reduce these impacts.</p> <p>No impacts on military personnel and the public would be expected, because access to the Site is restricted during construction and test activities.</p> <p>DTRA would continue to implement current health and safety procedures and programs, no impacts on onsite personnel would be anticipated.</p>	<p>Existing safety conditions at the Site would remain unchanged. No additional impacts are expected.</p>
<b>Socioeconomics and Environmental Justice</b>	<p>Construction, de-construction, and test activities associated with the Proposed Action would temporarily increase personnel within the Site, but this increase would be slight and would not require additional facilities to accommodate the personnel.</p> <p>Less-than-significant, beneficial impacts would result from increase revenues, purchase of materials, and purchase of goods and services in the local area.</p> <p>No impacts on environmental justice and protection of children would be expected from implementation of the Proposed Action.</p>	<p>The Site would continue to operate under current conditions. No impacts on socioeconomics and environmental justice would be expected.</p>

### 3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

DTRA initially considered all potentially relevant resource areas for analysis in this EA. In compliance with NEPA and CEQ regulations, the discussions of the affected environment in **Section 3** and the environmental consequences in **Section 4** focus only on those resource areas considered potentially subject to impacts and with potentially significant environmental issues. This section discusses: noise, visual resources, air quality, geology and soils, water resources, biological resources, cultural resources, infrastructure, hazardous materials and waste, safety, and socioeconomics and environmental justice. As discussed in **Section 1.3**, land use is not analyzed within this EA because implementation of the Proposed Action would not alter the existing use of the GRABS Site or the surrounding area.

#### 3.1 Noise

##### 3.1.1 Definition of the Resource

Sound is defined as a particular auditory impact produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory impact. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Noise can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between the source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity or noise above ambient levels exists.

**Noise Metrics and Regulations.** Human response to noise varies, as do the metrics used to quantify it. Generally, sound can be calculated with instruments that record instantaneous sound levels in decibels (dB). A-weighted decibel (dBA) is the unit used to characterize sound levels that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA (USEPA 1981a). **Table 3** compares common sounds and shows how they rank in terms of auditory impacts. As shown, a whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10 dBA increase seems twice as loud (USEPA 1981b).

Under the Noise Control Act of 1972, OSHA established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed to is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. These standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

While dBA may be used to measure construction noise produced at the GRABS Site, detonations are measured and managed in terms of the pressure waves produced. Therefore, the kilopascal is the primary unit used for measuring potential detonation noise and vibration impacts at the GRABS Site.

**Table 3. Sound Levels and Human Response**

Noise Level (dBA)	Common Sounds	Impact
10	Just audible	Negligible
30	Soft whisper (15 feet)	Very quiet
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant or freeway traffic	Telephone use difficult
80	Alarm clock (2 feet)	Annoying
90	Heavy truck (50 feet) or city traffic	Very annoying Hearing damage (8 hours)
100	Garbage truck	Very annoying
110	Pile drivers	Strained vocal effort
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort
140	Carrier deck jet operation	Painfully loud

Source: USEPA 1981b

### 3.1.2 Existing Conditions

**Ambient Noise Environment.** The ambient noise environment at Kirtland AFB on a daily basis is affected mainly by USAF and civilian aircraft operations and military vehicles. The commercial and military aircraft operations at the nearby Albuquerque International Sunport are the primary sources of regular noise at the installation. Vehicle use associated with military operations at Kirtland AFB consists of passenger vehicles, delivery trucks, and military on- and off-road vehicles. Passenger vehicles comprise most of the vehicles present at Kirtland AFB and the surrounding environment. Short-duration test events involving explosives occur infrequently at Kirtland AFB, but substantially contribute to the noise environment during the tests. Each test event is planned and announced well in advance to ensure receptors are informed and prepared for the event.

At the GRABS Site, the local noise environment is typically quiet, characteristic of a rural environment. Infrequent traffic along nearby roads and aircraft traveling to and from the local Albuquerque International Sunport contribute to the local noise environment on a daily basis. Ongoing test events occurring at the GRABS Site include construction and de-construction of test structures and detonations using up to the maximum NEW limit of 900 pounds; these test events dramatically alter the ambient onsite noise environment. However, DTRA conducts and manages explosive operations at the GRABS Site in a manner that minimizes off-site blast noise and associated annoyance.

**Construction Sound Levels.** Building construction activities can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from loaders, trucks, saws, and other work equipment. **Table 4** lists noise levels associated with common types of construction equipment. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

**Detonation Sound Pressure and Vibration.** Please refer to **Appendix B** concerning existing blast-related noise generated at the GRABS Site during ongoing testing operations, using a NEW of up to 900 pounds. Through careful pre- and during-test preparations, analyses, and monitoring, no noise or vibration complaints have been received from the public from GRABS Site operations over the last 42 years.

**Table 4. Predicted Noise Levels for Construction Equipment**

<b>Construction Category and Equipment</b>	<b>Predicted Noise Level at 50 feet (dBA)</b>
<b>Clearing and Grading</b>	
Bulldozer	80
Grader	80–93
Truck	83–94
Roller	73–75
<b>Excavation</b>	
Backhoe	72–93
Jackhammer	81–98
<b>Building Construction</b>	
Concrete mixer	74–88
Welding generator	71–82
Pile driver	91–105
Crane	75–87
Paver	86–88

Source: USEPA 1981b

Prior to any detonation at the GRABS Site capable of producing significant noise at an inhabited area off installation, DTRA performs weather-based, far-field blast propagation predictions to ensure blast noise and vibration levels are minimized. DTRA then measures the actual blast noise during the test event to confirm the predictions. These predictions are made using the BLASTO code, morning atmospheric soundings available from the local office of the National Weather Service, and real-time surface temperature and wind measurements. Some weather conditions are more favorable for the propagation of noise and vibration than others. For instance, vertical wind and temperature gradients in the atmosphere or an increase in temperature or wind speed with altitude tend to refract the airblast away from the ground, reducing the overpressures felt at a given distance when compared to a calm, homogenous atmospheric condition. An increase in temperature or wind speed with altitude tends to refract the airblast wave toward the ground, amplifying the overpressure felt at longer ranges (Defense Nuclear Agency 1993).

DTRA only conducts explosive tests under favorable weather conditions (i.e., those that minimize noise and overpressure propagation). If conditions are not favorable for minimal blast impacts, the explosive test is placed on hold until more favorable conditions prevail (Reinke 2013). See **Appendix B** for additional information regarding noise management at the GRABS Site.

The DDESB establishes safe distances for planned explosive events based on air pressures based on a K factor, which corresponds to a psi level. At a pressure of 0.7 psi, there is no hazard to personnel or facilities. For a NEW of 900 pounds, 0.7 psi corresponds to a safe distance of 3,167 feet.

Vibrations produced by detonations at the GRABS Site are generally not of concern, as they are barely detectable above the man-made seismic noise produced by the Albuquerque metropolitan area (Reinke 2013). The prior EA prepared for the GRABS Site in 1993 presents a table showing the potential airblast damage at given distances from various test events at the site. This table is presented below as **Table 5**.

**Table 5. Airblast Damage Criteria versus Distance\***

Criteria	Peak Overpressure kPa (psi)	Shock Tube				Surface	GRABS	Det. Tank	WS
		HST-7 inch	HST-2	HST-6	HST-20	1000 lb	592 lb	50 lb	1 lb
		Distance, ft							
<b>Biota</b>									
Birds in flight injured	68.9 (10)	30	40	35	100	95	80	36	88
Tree breakage (10% trees down)	24.1 (3.5)	60	70	70	200	180	151	66	18
Human eardrum rupture (1% of pop)	20.7 (3)	70	75	75	220	200	168	74	20
Incipient small mammal damage	13.8 (2)	90	105	100	280	270	226	99	27
Noise – Tinnitus (ringing) (163 dB)	2.4 (0.35)	235	340	325	950	970	806	354	96
Noise – OSHA impulsive limit (140 dB)	0.20 (0.029)	480	1050	100	3500	5900	4870	2137	580
Noise – Thunder sound (130 dB)	0.10 (0.015)	500	1250	1200	3700	10000	8396	3684	1000
<b>Structures</b>									
Chimney breakage (10% probability)	12.4 (1.8)	95	110	105	300	280	243	106	28
Major structural damage threshold	6.9 (1)	145	465	160	450	440	369	162	45
Roof failure (10% probability)	2.8 (0.4)	220	320	290	900	880	738	324	88
Inflight light aircraft damage threshold	1.4 (0.2)	300	500	480	1400	1400	1175	515	140
Door failure (10% probability)	1.0 (0.15)	325	580	560	1680	1800	1511	663	180
Broken bric-a-brac	0.7 (0.1)	350	720	700	2180	2200	1850	811	220
Broken tile and mirrors	0.6 (0.09)	360	780	750	2300	2600	2267	957	260
Wall and plaster cracks	0.4 (0.06)	400	840	800	2700	3400	2854	1252	340
Windows cracked – less than 1 in 1,000**	0.4 (0.058)***	400	860	820	2800	3500	3022	1344	350
- less than 1 in 1,000**	0.2 (0.029)***	480	1050	1000	3500	5900	4870	2137	580

Notes:

WS = Shallow Water Shock Tank

\* Summary of detonation-produced airblast environmental damage criteria and the distance at which the criteria are met. Distances are given for a calm, homogeneous atmosphere. For overpressures below approximately 0.4 psi, if a strong amplifying gradient is present, these distances could be as much as seven times greater, and if a strong reducing gradient is present, distances could be as small as 1/3 the values shown.

\*\* Residential population.

\*\*\* Peak-to-peak amplitudes.

## 3.2 Visual Resources

### 3.2.1 Definition of the Resource

Visual resources include the natural and man-made physical features that give a particular landscape its character; this influences the visual appeal of an area for residents and visitors. The features that form the overall visual impression a viewer receives include landforms, vegetation, water, color, adjacent scenery, scarcity, and man-made modifications. Resources such as designated scenic rivers, roads, recreation areas, or other public lands create important visual aesthetic features for the public. In general, a feature observed within a landscape can be considered as “characteristic” (or character defining) if it is inherent to the composition and function of the landscape. Landscapes do change over time, so the assessment of the environmental impacts of a proposed action on a given landscape area must be made relative to the “characteristic” features currently composing the landscape or area.

### 3.2.2 Existing Conditions

Military and civilian airfields and other developed government and military facilities comprise much of the visual environment of Kirtland AFB. The prominent visual features of the installation include hangars, maintenance and support facilities, aircraft, and other government development. Off installation, the visual environment varies from urban to rangeland to forest. To the north and west of Kirtland AFB are urban areas of the city of Albuquerque; to the northeast and east, open spaces, forests, and rangeland are the prominent visual features; and to the south of Kirtland AFB, including immediately to the south of the GRABS Site, are Isleta Pueblo Indian Reservation lands, which are generally open space, forests, or vacant land (Kirtland AFB 2011).



The GRABS Site is located in the southeast corner of the western half of Kirtland AFB (i.e., Kirtland West) (see **Figures 1** and **2**). This location places the GRABS Site within 0.5 mile of the Kirtland AFB southern boundary and the adjacent Isleta Pueblo Indian Reservation to the south (see **Figure 2**). Although Target Road extends diagonally from west to east across the Site, it serves a low number of government- and personally-owned vehicles. Existing onsite structures include those depicted in **Figure 3**.

From a visual resources perspective, the GRABS Site is primarily flat, open land with a variety of as-needed training structures that lack consistency of appearance and reflect the reactive nature of the Site’s development. The dominant component of the GRABS Site landscape is the 825 foot long, 20 foot diameter HST-20 and its supporting structures (see **Section 1.1.5.3**). Other test related structures also dot the landscape, although they are less prominent and are generally situated around the HST-20 (see **Figure 3**). With the exception of a hilltop testing structure located to the northeast of the GRABS Site, lands surrounding the Site consist of undeveloped open space (see **Figure 2**). The Manzano Mountains dominate the viewshed to the east of the GRABS Site. Ongoing test activities at the Site produce periodic dust clouds, but these are short-term in nature and do not greatly diminish existing visual resources.



The majority of the test structures at the GRABS Site are not required to comply with the Kirtland AFB Architectural Compatibility Plan, because they are generally temporary, modular

structures constructed in response to various testing and training needs at the Site over time. In addition, non-harmful debris is routinely left scattered across the GRABS Site at the conclusion of each explosive test event (see photos in **Section 2.2.2**).

### 3.3 Air Quality

#### 3.3.1 Definition of the Resource

In accordance with federal Clean Air Act (CAA) requirements, the air quality in a region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin”, and the prevailing meteorological conditions.

**Ambient Air Quality Standards.** Under the CAA, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone ( $O_3$ ) measured as either volatile organic compounds (VOCs) or total nitrogen oxides ( $NO_x$ ), carbon monoxide (CO), nitrogen dioxide ( $NO_2$ ), sulfur dioxide ( $SO_2$ ), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [ $PM_{10}$ ] and particulate matter equal to or less than 2.5 microns in diameter [ $PM_{2.5}$ ]), and lead (Pb) (40 CFR Part 50). The CAA also gives states the authority to establish air quality rules and regulations. The state of New Mexico has adopted the NAAQS and has promulgated additional State Ambient Air Quality Standards (SAAQS) for criteria pollutants. In some cases, the SAAQS are more stringent than the federal primary standards. **Table 6** presents the USEPA NAAQS and SAAQS for the federally listed criteria pollutants.

**Attainment versus Non-attainment and General Conformity.** USEPA classifies the air quality of an Air Quality Control Region (AQCR), or subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either “attainment”, “non-attainment”, “maintenance”, or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; non-attainment indicates that criteria pollutant levels exceed one or more of the NAAQS; maintenance indicates that an area was previously designated non-attainment, but is now in attainment; and an unclassified air quality designation by USEPA means that there is not enough information to appropriately classify an AQCR, so the area is considered to be in attainment for the NAAQS.

USEPA has delegated the authority for ensuring compliance with the NAAQS in New Mexico to the NMED Air Quality Bureau. The NMED Air Quality Bureau has delegated authority over air quality in Bernalillo County to the AEHD-AQD. In accordance with the CAA, each state must develop a State Implementation Plan (SIP). A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all of the NAAQS.

The General Conformity Rule requires that any federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a federal action does not: (1) cause a new violation of the NAAQS; (2) contribute to an increase in the frequency or severity of violations of the NAAQS; or (3) delay the timely attainment of any of the NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS. The General Conformity Rule applies only to significant actions in non-attainment or maintenance areas.

**Table 6. National and State Ambient Air Quality Standards**

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	State	
CO	8-hour <sup>(1)</sup>	9 ppm (10 mg/m <sup>3</sup> )	8.7 ppm	None
	1-hour <sup>(1)</sup>	35 ppm (40 mg/m <sup>3</sup> )	13.1 ppm	None
Pb	Rolling 3-Month Average	0.15 µg/m <sup>3</sup> <sup>(2)</sup>	--	Same as Primary
NO <sub>2</sub>	Annual Arithmetic Mean	53 ppb <sup>(3)</sup>	50 ppb	Same as Primary
	1-hour	100 ppb <sup>(4)</sup>	100 ppb	None
PM <sub>10</sub>	24-hour <sup>(5)</sup>	150 µg/m <sup>3</sup>	--	Same as Primary
PM <sub>2.5</sub>	Annual Arithmetic Mean <sup>(6)</sup>	12 µg/m <sup>3</sup>	--	15 µg/m <sup>3</sup>
	24-hour <sup>(7)</sup>	35 µg/m <sup>3</sup>	--	Same as Primary
O <sub>3</sub>	8-hour <sup>(8)</sup>	0.075 ppm (2008 Standard)	--	Same as Primary
	8-hour <sup>(9)</sup>	0.08 ppm (1997 Standard)	--	Same as Primary
	1-hour <sup>(10)</sup>	0.12 ppm	--	Same as Primary
SO <sub>2</sub>	1-hour	75 ppb <sup>(11)</sup>	--	0.5 ppm (3-hour) <sup>(1)</sup>

Sources: USEPA 2011a; USEPA 2013; State of New Mexico 2009

**Notes:**

1. Not to be exceeded more than once per year.
2. Final rule signed 15 October 2008. The 1978 lead standard (1.5 µg/m<sup>3</sup> as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
3. The official level of the annual NO<sub>2</sub> standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
4. To attain this standard, the 3-year average of the 98<sup>th</sup> percentile of the daily maximum 1-hour average at each monitor within the area must not exceed 100 ppb (effective 22 January 2010).
5. Not to be exceeded more than once per year on average over 3 years.
6. To attain this standard, the 3-year average of the weighted annual mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 12.0 µg/m<sup>3</sup>.
7. To attain this standard, the 3-year average of the 98<sup>th</sup> percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m<sup>3</sup> (effective 17 December 2006).
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).
- 9a. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
  - b. The 1997 standard – and the implementation rules for that standard – will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
  - c. USEPA is in the process of reconsidering these standards (set in March 2008).
- 10a. USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (anti-backsliding).
  - b. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
11. Final rule signed on 2 June 2010. To attain this standard, the 3-year average of the 99<sup>th</sup> percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

**Acronyms:**mg/m<sup>3</sup> = milligram per square meter

ppb = parts per billion

ppm = parts per million

µg/m<sup>3</sup> = microgram per square meter

**Federal Prevention of Significant Deterioration.** Federal Prevention of Significant Deterioration (PSD) regulations apply in NAAQS attainment areas to a major new stationary source (i.e., source with the potential to emit 250 tons per year [tpy] of any criteria pollutant, such as a new power plant), or a significant modification to a major stationary source (i.e., a change that adds 15 to 40 tpy to the facility's potential to emit depending on the pollutant). Additional PSD major source and significant modification thresholds apply for greenhouse gases (GHGs), as discussed below in the Greenhouse Gas Emissions subsection.

PSD permitting can also apply to a proposed action if all three of the following conditions exist: (1) the proposed action is a modification with an anticipated net emissions increase to an existing PSD major source; (2) the proposed action is within 10 kilometers of a national park or wilderness area (i.e., a Class I Area); and (3) regulated stationary source pollutant emissions would cause an increase in the 14-hour average concentration of any regulated pollutant in the Class I Area of 1 microgram per cubic meter ( $\mu\text{g}/\text{m}^3$ ) or more (40 CFR §52.21[b][23][iii]). A Class I Area includes national parks larger than 6,000 acres, national wilderness areas and national memorial parks larger than 5,000 acres, and international parks. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's Class designation (40 CFR §52.21[c]).

**Title V Requirements.** Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A Title V major stationary source has the potential to emit more than 100 tpy of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Section 112 of the CAA defines the sources and kinds of HAPs.

**Greenhouse Gas Emissions.** GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs include carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ), and nitrous oxide. On 22 September 2009, USEPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on  $\text{CO}_2$  and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of  $\text{CO}_2$  equivalent emissions per year, but excludes mobile source emissions. The first emissions report under the GHG Reporting Program was published with 2010 emissions data. For the 2011 reporting year, USEPA added 12 additional emissions sources; during this time frame, approximately 8,000 facilities reported 3.3 billion tons of  $\text{CO}_2$  equivalent direct emissions (USEPA Greenhouse Gas Reporting Program 2013). GHG emissions will also be factors in PSD and Title V permitting and reporting, according to a USEPA rulemaking issued on 3 June 2010 (75 Federal Register 31514). GHG emissions thresholds of significance for permitting of stationary sources are 75,000 tons  $\text{CO}_2$  equivalent per year and 100,000 tons  $\text{CO}_2$  equivalent per year under these permit programs.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, was signed in October 2009 and requires agencies to set goals for reducing GHG emissions. One requirement within EO 13514 is the development and implementation of an agency Strategic Sustainability Performance Plan (SSPP) that prioritizes agency actions based on lifecycle return on investment. Each SSPP is required to identify, among other things, "agency activities, policies, plans, procedures, and practices" and "specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics" relevant to the implementation of EO 13514. The SSPP is published annually and describes specific actions DOD will take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or

controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities, but from sources that are not owned or directly controlled by the agency. The GHG goals in the DOD SSPP include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to Fiscal Year (FY) 2008 emissions, and reducing Scope 3 GHG emissions by 13.5 percent by 2020, relative to FY 2008 emissions.

### 3.3.2 Existing Conditions

Kirtland AFB is located in Bernalillo County, New Mexico, which is located within Albuquerque-Mid Rio Grande Intrastate (AMRG) AQCR 152. The AMRG AQCR also includes portions of Sandoval and Valencia counties, New Mexico (USEPA 2002a). As defined by 40 CFR §81.332, Kirtland AFB is in an area that is designated as attainment/unclassified for all criteria pollutants. Although Bernalillo County is in attainment for CO, the county is considered a maintenance area because it has a Limited Maintenance Plan for CO (USEPA 2002b, USEPA 2011b, USEPA 2012). Based on this designation, the General Conformity Rule requirements are applicable to the Proposed Action for CO. According to 40 CFR Part 81, no Class I Areas are located within 10 kilometers of Kirtland AFB (USEPA 2011c).

Conformity refers to consistency between a project or plan and the emission budgets in the SIP for air quality. This requires that emissions resulting from a project or plan will not contribute to or cause a violation of the NAAQS. General Conformity Rule requirements apply to federal actions, such as construction projects and new land use developments, and stipulate that such actions will not cause or contribute to a violation of the NAAQS (AEHD-AQD 2004).

In 1996, Bernalillo County was redesignated from a CO nonattainment area to an attainment area with a maintenance plan (commonly called a maintenance area). The maintenance area designation is for the 20-year period beginning 13 June 1996 and continuing until 13 June 2016. The AEHD-AQD was required to revise its CO Maintenance Plan and incorporate the plan into the New Mexico SIP to show Albuquerque/Bernalillo County will meet the CO NAAQS for the remainder of the 20-year period (the 10-year period beginning 13 June 2006). Because CO has been steadily declining and the area has had no recent violations, the AEHD-AQD submitted a CO Limited Maintenance Plan, an option provided by the USEPA if monitored CO levels can remain below 85 percent of the CO NAAQS (AEHD-AQD 2004).

Kirtland AFB is currently subject to General Conformity Rule requirements because of the maintenance area classification; however, Bernalillo County has received approval from the USEPA for its CO Limited Maintenance Plan, which eliminates the conformity requirements found in 20.11.01 NMAC General Conformity. This plan took effect in June 2006 and makes conformity analyses unnecessary since there are no upper emissions limits to which federal projects must conform. As long as no violations of the CO NAAQS occur, Bernalillo County will be officially designated as an attainment area for CO in the year 2016 (AEHD-AQD 2004).

The most recent emissions for Bernalillo County and the AMRG AQCR are shown in **Table 7**. Bernalillo County is considered the local area of influence, and the AMRG AQCR is considered the regional area of influence for this air quality analysis. The emissions inventory for the AMRG AQCR includes emissions from all of Bernalillo, Sandoval, and Valencia counties. In actuality, the AMRG AQCR includes all of Bernalillo County and only portions of Sandoval and Valencia counties.

**Table 7. Local and Regional Air Emissions Inventory for the Proposed Action (2008)**

	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>	<b>PM<sub>2.5</sub> (tpy)</b>
<b>Bernalillo County</b>	17,245	30,560	99,777	312	58,563	7,639
<b>AMRG AQCR*</b>	27,436	88,359	149,558	427	133,347	16,255

Source: USEPA 2008  
Note: \* The emissions inventory for the AMRG AQCR includes emissions from all of Bernalillo, Sandoval, and Valencia counties. In actuality, the AMRG AQCR includes all of Bernalillo County and only portions of Sandoval and Valencia counties.  
Acronym: tpy = tons per year

There are various air emissions sources at Kirtland AFB, including emergency generators, boilers, water heaters, fuel storage tanks, fuel dispensing systems, gasoline service stations, surface coating operations, aircraft engine facilities, fire training, remediation activities, mulching activities, miscellaneous chemical usage, and open detonation of munitions for military training, emergency remediation, and research and development.

As required by the Albuquerque-Bernalillo County AQCR regulations at Title 20, Chapter 11 of the NMAC, the installation estimates annual emissions from stationary sources and provides this information to the AEHD-AQD. **Table 8** summarizes the 2013 air emissions inventory for Kirtland AFB.

**Table 8. Calendar Year 2013 Air Emissions Inventory for Kirtland AFB**

<b>Actual Emissions</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>
	9.63	76.42	5.66	0.57	0.81
Source: Kirtland AFB 2013a					
Acronym: tpy = tons per year					

The GRABS Site only generates minor amounts of air emissions, and only during test events; the Site remains unused for the remainder of the year. **Table 9** presents the amount of criteria pollutants and total hazardous air pollutants emitted during each test event (assuming use of the maximum NEW of 900 pounds) and over the course of each year under current conditions (i.e., 20 test events per year).

During a test event, up to 30 personnel and 12 vehicles may be present on the GRABS Site. The onsite solar generator (with propane back-up) as shown in **Figure 3** may be used during a test event. Annually, approximately 20 test events occur at the GRABS Site, with each event lasting, on average, 4 days. These activities, including pre-test site preparations, generate minor amounts of air emissions, substantially below the thresholds set forth in **Section 3.3.1**.

As identified in **Section 1.1.5.8**, DTRA complies with the conditions of Fugitive Dust Control Programmatic Permit #P12-0007 and Open Burn Permit #14-0001 issued by the AEHD-AQD. Please see **Appendix C** for more information.

**Table 9. Pollutants Emitted During Ongoing Test Events at the GRABS Site**

Pollutant	Amount of Pollutant Emitted At Maximum NEW of 900 pounds (pounds)	Amount of Pollutant Emitted Annually, Assuming 20 Test Events Per Year at Maximum NEW of 900 Pounds	
		(pounds)	(tpy)
Carbon monoxide (CO)	243.0	4860.0	2.4
Nitrogen oxides (NO <sub>x</sub> )	31.5	630.0	0.3
Particulate matter (PM)	540.0	10,800.0	5.4
Sulfur dioxide (SO <sub>2</sub> )	11.7	234.0	0.1
Volatile organic compounds (VOC)	6.4	127.8	0.1
Total hazardous air pollutants (HAP)	11.4	229.0	0.1
<b>Total</b>	<b>844.0</b>	<b>16,880.8</b>	<b>8.4</b>

Source: USEPA 1998a

## 3.4 Geology and Soils

### 3.4.1 Definition of the Resource

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology. Topography and physiography pertain to the general shape and arrangement of the land surface, including its height and the position of its natural and human-made features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information is derived from field analyses based on observations of the surface and borings to identify subsurface composition.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types, in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential, affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban-developed land or water. The intent of the FPPA is to minimize the extent that federal programs contribute to the unnecessary conversion of high-quality farmland to non-agricultural uses. The FPPA also ensures that federal programs are administered in a manner that, to the extent practicable, is compatible with private, state, and local government programs and policies to protect farmland.

The implementing procedures of the FPPA and U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) require federal agencies to evaluate the adverse impacts (direct and indirect) of their activities on prime and unique farmland, and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse impacts.

Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action are based on preparation of the Farmland Conversion Impact Rating Form (Form AD-1006) for areas where prime farmland soils occur and by applying criteria established at Section 658.5 of the FPPA (7 CFR §658.5). The USDA NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementing the FPPA (see 7 CFR §658.5, July 1984).

### 3.4.2 Existing Conditions

**Regional Geology.** Kirtland AFB is located near the junction of five physiographic provinces: the Colorado Plateau, the Basin and Range, the Southern Rocky Mountains, the Rio Grande Rift, and the Great Plains (Grant 1981). Kirtland AFB is situated along the eastern margin of the Albuquerque Basin, a major feature of the Rio Grande Rift. The Rio Grande Rift measures approximately 620 miles long and is bordered on the west by the Colorado Plateau and on the east by the Great Plains. The Albuquerque Basin is north-trending and measures approximately 90 miles long and 31 miles wide. It extends from near the Rio Grande to the foothills of the Manzano Mountains (i.e., the foothills of the Manzano Mountains are also known as the Manzanita Mountains). The Albuquerque Basin is defined to the south by the Socorro Channel, to the north by the Nacimiento Uplift, to the west by the Puerco Plateau and Lucero Uplift, and to the east by the Manzanita Mountains. The widest point of the Albuquerque Basin occurs near Kirtland AFB; this Basin tapers off gradually towards its north and south ends. The Basin was deepened and local mountain ranges were tilted by large-scale faulting that occurred approximately 11.2 to 5.3 million years ago. Geologic formations found within Kirtland AFB range in age from Precambrian granites to present-day windblown sands (Kirtland AFB 2012a).

**Topography.** Most of Kirtland AFB is situated on a relatively flat mesa; however, the mesa is cut by the east-west trending Tijeras Arroyo that drains into the Rio Grande and is interrupted by the Manzanita Mountains. Elevations at Kirtland AFB range from 5,200 feet amsl in the western portion of the installation to almost 8,000 feet amsl in the Manzanita Mountains (Kirtland AFB 2012a). The elevation of the GRABS Site ranges between approximately 5,840 and 5,880 feet amsl, a relief of approximately 40 feet. The Site slopes gently to the north and west, draining generally to the north and northwest.

**Soils.** Twenty-six soil types have been identified at Kirtland AFB (Kirtland AFB 2012a). The GRABS Site includes six different soil map units:

1. *Latene sandy loam, 1 to 5 percent slopes* (LtB), covers approximately 57 percent of the GRABS Site.
2. *Tijeras gravelly fine sandy loam, 1 to 5 percent slopes* (TgB), covers approximately 29 percent of the GRABS Site.
3. *Madurez-Wink association, gently sloping* (MWA), covers approximately 7 percent of the GRABS Site.
4. *Embudo-Tijeras complex, 0 to 9 percent slopes* (EtC), covers approximately 3 percent of the GRABS Site.
5. *Wink fine sandy loam, 0 to 5 percent slopes* (WaB), covers approximately 3 percent of the GRABS Site.
6. *Ildefonso gravelly sandy loam, 1 to 9 percent slopes* (ILC), covers approximately 1 percent of the GRABS Site.

According to the USDA NRCS (USDA NRCS Web Soil Survey 2013), all of these soils are well-drained, have a low to moderate water capacity, are not subject to flooding (with the exception of EtC, which is listed as "rarely flooding"), are not subject to ponding, have a water table depth of greater than 80 inches, and are not hydric or prime farmland soils. **Figure 5** depicts the location of each soil map unit within the GRABS Site. The EtC soils are located adjacent to the drainage swale on the northern portion of the GRABS Site.

DTRA determines soil engineering limitations at the GRABS Site based on data available from the USDA NRCS. DTRA considers engineering limitations for construction of small commercial buildings, roads, and shallow excavations for utilities at the GRABS Site, as follows:

- **LtB** and **TgB** are rated as not limited for small commercial buildings; not limited for roads and streets; and very limited for shallow excavations (due to the fact that cutbacks can cave in and fail).
- **MWA** and **WaB** are rated as not limited for small commercial buildings; not limited for roads and streets; and somewhat limited for shallow excavations (due to the fact that cutbacks can cave in and fail).
- **EtC** is rated as very limited for small commercial buildings due to flooding; somewhat limited for roads and streets due to flooding; and very limited for shallow excavations (due to the fact that cutbacks can cave in and fail).
- **ILC** is rated as somewhat limited for small commercial buildings due to slope; not limited for roads and streets; and very limited for shallow excavations (due to the fact that cutbacks can cave in and fail).

**Prime Farmland.** None of the six soil types underlying the GRABS Site is a prime farmland soil or farmland soil of statewide importance (USDA NRCS Web Soil Survey 2013). Kirtland AFB is not currently used for agricultural purposes, and no agricultural use is planned for the future.

**Geologic Hazards.** Geological hazards are defined as natural geologic events that can endanger human lives and threaten property. Examples of geologic hazards include earthquakes, landslides, sinkholes, tsunamis, and volcanoes. In Albuquerque, the primary geologic hazard that could endanger lives or threaten property is an earthquake. The U.S. Geological Survey (USGS) has classified the Albuquerque area as having a moderate potential for earthquake hazards and has given the region a seismic hazard rating of 16 to 32 percent gravity. This means that, during an earthquake that has a 2 percent chance of occurring during a 50-year period, moderate to major damage could occur (USGS 2008). Overall, this means that an earthquake resulting in moderate to major damage could occur once every approximately 2,500 years in the Albuquerque area.

## 3.5 Water Resources

### 3.5.1 Definition of the Resource

Water resources are natural and man-made sources of water that are available for use by, and for the benefit of, humans and the environment. Water resources relevant to Kirtland AFB's location in New Mexico include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.



**Groundwater.** Groundwater is water that exists in the saturated zone beneath the Earth's surface and includes underground streams and aquifers. Groundwater is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial purposes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations.

Groundwater quality and quantity are regulated under several programs. The federal Underground Injection Control regulations, authorized under the Safe Drinking Water Act (SDWA), require a permit for the discharge or disposal of fluids into a well. The federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply.

**Surface Water.** Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contribution to the economic, ecological, recreation, and human health of a community or locale.

Wetlands perform several hydrologic functions including: water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of "waters of the United States" under Section 404 of the Clean Water Act (CWA). The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The U.S. Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 329).

A water body can be deemed "impaired" if water quality analyses conclude that exceedances of the water quality standards, established under the CWA, occur. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the source(s) causing the impairment. A TMDL is the maximum amount of a substance that can be assimilated by a water body without causing impairment. The CWA also mandated the NPDES program, which regulates the discharge of point (end of pipe) and non-point (storm water) sources of water pollution and requires a permit for any discharge of pollutants into waters of the United States.

Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters. Proper management of storm water flows, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics. Prolonged increases in storm water volume and velocity associated with development and increased impervious surfaces have the potential to impact adjacent streams as a result of stream bank erosion and channel widening or down cutting associated with the adjustment of the stream to the change in flow characteristics. Storm water management systems are typically designed to contain runoff onsite during construction and to maintain re-development storm water flow characteristics following development through either the application of infiltration or retention practices. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event often leads to downstream flooding and the environmental and economic damages associated with flooding.

The USEPA published the technology-based Final Effluent Limitations Guidelines (ELGs) and New Source Performance Standards for the Construction and Development Point Source Category on 1 December 2009 to control the discharge of pollutants from construction sites. The Rule became effective on 1 February 2010. After this date, all USEPA- or state-issued construction general

permits were to be revised to incorporate the ELG requirements, with the exception of the numeric limitation for turbidity, which has been suspended while the USEPA further evaluates this limitation. The USEPA currently regulates large (equal to or greater than 1 acre) construction activity through the 2012 Construction General Permit (CGP). The 2012 CGP replaces the 2008 CGP, which expired on 15 February 2012, and provides coverage for new and existing construction projects for a period of 5 years.

The 2012 CGP includes a number of modifications to the 2008 CGP, many of which are necessary to implement the ELGs and New Source Performance Standards for Construction and Development point sources, known as the "C&D rule". The C&D rule requires construction site operators to meet restrictions on erosion and sedimentation control, pollution prevention, and stabilization. Permittees must select, install, and maintain effective erosion- and sedimentation-control measures as identified and as necessary to comply with the 2012 CGP, including the following:

- Sediment controls, such as sediment basins, sediment traps, silt fences, vegetative buffer strips
- Offsite sediment tracking and dust control
- Runoff management
- Erosive velocity control
- Post-construction storm water management
- Construction and waste materials management
- Non-construction waste management
- Erosion control and stabilization
- Spill/release prevention

Construction activities, such as clearing, grading, trenching, and excavating, disturb soils and can create sediment. If not managed properly, disturbed soils can be easily washed into nearby surface water bodies during storm events, where water quality is reduced and sedimentation is increased. Section 438 of the EISA (42 USC §17094) establishes into law new storm water design requirements for federal construction projects that disturb a footprint of greater than 5,000 square feet of land. EISA Section 438 requirements are independent of storm water requirements under the CWA. The project footprint consists of all horizontal hard surface and disturbed areas associated with project development. Under these requirements, pre-development site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Pre-development hydrology shall be modeled or calculated using recognized tools and must include site-specific factors, such as soil type, ground cover, and ground slope.

Post-construction analyses shall be conducted to evaluate the effectiveness of the as-built storm water reduction features (DOD 2010a). These regulations were incorporated into an applicable DOD Unified Facilities Code (UFC) in April 2010, which stated that Low Impact Design (LID) features need to be incorporated into new construction activities to comply with the restrictions on storm water management promulgated by EISA Section 438. LID is a storm water management strategy designed to maintain site hydrology and mitigate the adverse impacts of storm water runoff and non-point source pollution. LIDs can manage the increase in runoff between pre- and post-development conditions on the project site through interception, infiltration, storage, and evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of LID

methods include bio-retention, permeable pavements, cisterns/recycling, and green roofs (DOD 2010b). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Storm Water Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (USEPA 2009). Site design shall incorporate LIDs to promote storm water retention and re-use to the maximum extent technically feasible.

**Floodplains.** Floodplains are areas of low, level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and provision of habitat for a diversity of plants and animals. Flood potential is evaluated by the Federal Emergency Management Agency, which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year, or a flood event in the area once every 100 years. The risk of flooding is influenced by local topography, the frequencies of precipitation events, the size of the watershed above the floodplain, and upstream development. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreation and conservation activities, to reduce the risks to human health and safety. EO 11988, *Floodplain Management*, directs federal agencies to avoid siting development or projects within floodplains unless the agency determines that there is no practicable alternative.

### 3.5.2 Existing Conditions

**Groundwater.** Kirtland AFB is located within the limits of the Rio Grande Underground Water Basin, which is defined as a natural resources area and designated as a "declared underground water basin" by the state of New Mexico. The basin is regulated by the state as a sole source of potable water, although the Albuquerque area will be supplemented in the future with surface water diverted from the San Juan and Chama rivers to the Rio Grande. The Rio Grande Basin's source of groundwater is the Santa Fe Aquifer, which is most likely recharged east of the installation in the Manzanita Mountains (Kirtland AFB 2012a). Two aquifers, a regional aquifer and a perched aquifer, underlie Kirtland AFB.

The regional aquifer is present under all of Kirtland AFB and ranges in depth from near surface to 200 feet below ground surface (bgs) east of the major fault zones in the eastern portion of the installation, and to depths of 350 to 500 feet bgs west of the fault zone. The regional aquifer is used for the installation's water supply. Kirtland AFB has a court-decreed<sup>7</sup> water right that allows it to withdraw up to 6,000 acre-feet of water, or approximately 2 billion gallons, per year from the underground aquifer (Kirtland AFB 2011). In 2012, Kirtland AFB pumped 2,693 acre-feet (877 million gallons) of water from these wells (Kirtland AFB 2013b). The perched aquifer is limited in area, straddling the Tijeras Arroyo northeast of where the Tijeras Arroyo and the Arroyo del Coyote meet, and occurs at depths of 200 to 400 feet bgs.

The perched aquifer is a result of infiltration of water from both man-made and natural origins, with a flow direction to the southeast. The perched aquifer is not used for any purpose. The average depth to groundwater beneath Kirtland AFB is 450 to 550 feet bgs. The presence of faults has a direct bearing on the movement and occurrence of groundwater in the vicinity of Kirtland AFB. The groundwater flow direction is down basin (south), with local variations and even reversals due to groundwater pumping, specific geologic structures, or shallow influences near the Rio Grande (Kirtland AFB 2011).

<sup>7</sup> On 3 December 1973, the U.S. District Court Judgment and Order incorporated a 27 November 1973 Stipulation of Parties to allow Kirtland AFB to draw a total of 6,398 acre-feet of groundwater from two wells within the Rio Grande Underground Water Basin (4,500 acre-feet and 1,898 acre-feet), as well as three minor decrees to draw 3 acre-feet per year of groundwater from three domestic wells.

During the drilling of the three groundwater monitoring wells on the northern portion of the GRABS Site in 2011, groundwater was encountered at depths ranging from approximately 135 to 240 feet bgs (SNL 2012). See **Section 3.9.2** for additional information.

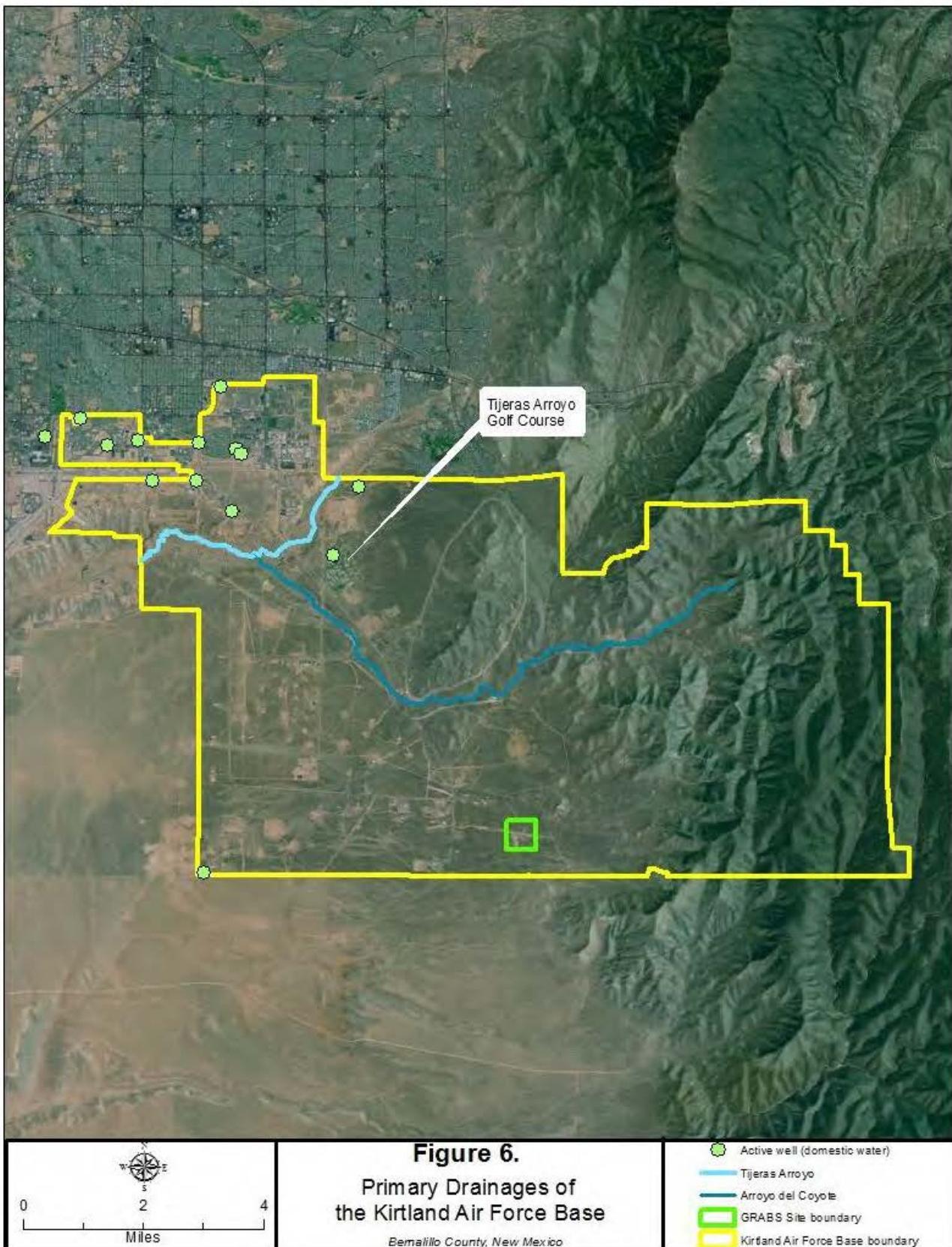
**Surface Water.** Kirtland AFB is located within the Rio Grande watershed. The Rio Grande is the major surface hydrologic feature in central New Mexico, flowing north to south through Albuquerque, approximately 5 miles west of Kirtland AFB (Kirtland AFB 2012a). Surface water resources on Kirtland AFB reflect its dry climate. The average annual rainfall in Albuquerque is 9 inches, with half of the average annual rainfall occurring from July to October during heavy thunderstorms (Kirtland AFB 2012a). Surface water generally occurs in the form of storm water sheet flow that drains into small gullies during heavy rainfall events (Kirtland AFB 2012a). Surface water generally flows across Kirtland AFB in a westerly direction toward the Rio Grande.

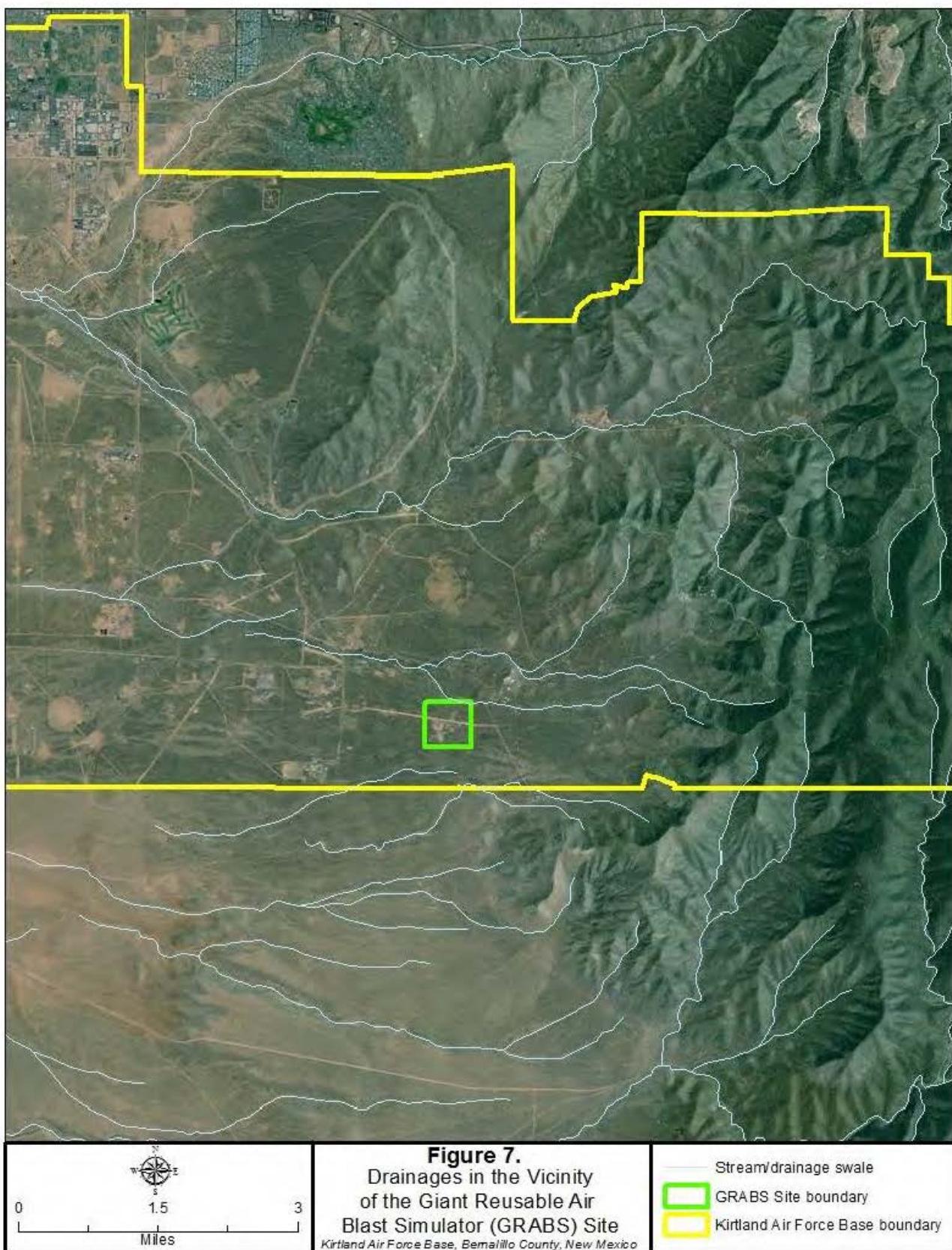
There are no natural lakes or rivers on Kirtland AFB. Six man-made ponds have been created on the Tijeras Arroyo Golf Course, which is located approximately 4.6 miles northwest of the GRABS Site. There are 10 wetlands supplied by at least 15 naturally occurring springs on Kirtland AFB; however, none are located within the GRABS Site (Kirtland AFB 2009a).

The two main surface water drainage channels on Kirtland AFB are the Tijeras Arroyo and the smaller Arroyo del Coyote, which joins the Tijeras Arroyo approximately 1 mile west of the Tijeras Arroyo Golf Course (see **Figure 6**). At its most northern boundary, the GRABS Site lies approximately 2.1 miles south of the Arroyo del Coyote. The Tijeras Arroyo and Arroyo del Coyote are tributaries to the Rio Grande. The Tijeras Arroyo and Arroyo del Coyote flow intermittently during heavy thunderstorms and the spring snowmelt, but most of the water percolates into alluvial deposits or is lost to the atmosphere via evapotranspiration (Kirtland AFB 2011). The Tijeras Arroyo, which is dry for most of the year, is the primary surface channel that drains surface water from Kirtland AFB to the Rio Grande. Precipitation reaches the Tijeras Arroyo through a series of storm drains, flood canals, and small, mostly unnamed arroyos. Nearly 95 percent of the precipitation that flows through the Tijeras Arroyo evaporates before it reaches the Rio Grande. The remaining 5 percent is equally divided between groundwater recharge and runoff (Kirtland AFB 2011).

Storm water runoff on Kirtland AFB predominantly flows through the drainage patterns created by natural terrain and paved surfaces. In some areas, runoff is directed through ditches and piping, with direct discharges into a receiving stream or surface water body. Issued in 2014, Kirtland AFB operates under a Watershed-based NPDES Municipal Separate Storm Sewer System (MS4) Permit, which regulates storm water sediment and pollutant discharges from the installation. The MS4 collects and conveys storm water from storm drains, pipes, and ditches and discharges into the Tijeras Arroyo and the city of Albuquerque's MS4. Storm water on and within the vicinity of GRABS Site infiltrates into the ground or discharges via surface runoff into improved conveyance ditches and channels along Target Road, or flows toward unnamed drainage swales located to the north and south of the Site (see **Figures 2** and **3**). **Figure 6** identifies the locations of the Tijeras Arroyo and Arroyo del Coyote, as well as domestic water wells on Kirtland AFB.

**Figure 7** depicts the locations of all surface water drainages in the vicinity of the GRABS Site. As shown in that figure and per available information, these drainages convey water from the foothills of the Manzanita Mountains. The drainages in closest proximity to the GRABS Site (i.e., to the northeast and south) are not tributaries of larger river systems and do not convey water to any other body of water; these drainages terminate prior to intersecting any larger surface water feature.





Kirtland AFB operates under three NPDES Permits, the General Storm Water Permit for industrial activities, the Watershed MS4 Permit for storm water discharges via drainage systems, and the CGP for construction projects. If a project at Kirtland AFB is subject to the CGP requirements, the contractor must develop a SWPPP and provide the SWPPP to the 377 Mission Support Group/Civil Engineering Installation Management – Environmental Management (377 MSG/CEIE) for review prior to submitting an NOI for permit coverage under the USEPA CGP. The SWPPP must be developed and the contractor must be issued a CGP before work begins.

Kirtland AFB must also comply with MS4 permit requirements and has developed a Storm Water Management Plan as required by the MS4 permit (Kirtland AFB 2011). When construction projects are not subject to NPDES CGP requirements (i.e., due to the size of the project or waivers), the contractor must submit a list of BMPs to the Kirtland AFB Water Quality Program that the contractor intends to use to mitigate storm water pollutants. The list of BMPs submitted by the contractor documents compliance with the Kirtland AFB MS4 permit.

**Floodplains.** A 100-year floodplain encompasses both the Arroyo del Coyote and Tijeras Arroyo. These are the only two arroyos with a floodplain on the installation. Arroyo del Coyote and Tijeras Arroyo floods occur infrequently and are characterized by high peak flows, small volumes, and short durations (Kirtland AFB 2012). The GRABS Site is not located within the 100- or 500-year floodplains (Kirtland AFB 2011).

## 3.6 Biological Resources

### 3.6.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats in which they occur, as well as native or introduced species found in landscaped or disturbed areas. Applicable laws, regulations, and policies regarding biological resources are included in **Appendix D**. Protected species are defined as those listed as threatened, endangered, or proposed or candidate for listing by the USFWS or the NMDGF. Federal species of concern are not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of a proposed federal action.

Sensitive habitats include those areas designated by the USFWS as critical habitat protected under the ESA and sensitive ecological areas as designated by state or federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, or crucial summer/winter habitats).

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, and erosion protection. Wetlands have been defined as areas that are “inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE 1987). Wetlands are protected as a subset of “waters of the United States” under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. For regulatory purposes, wetlands are defined by three factors: hydrologic regime, soil characteristics, and vegetation. In addition, many states have local regulations governing wetlands and their buffer areas.

In 2006, the U.S. Supreme Court addressed the jurisdictional scope of Section 404 of the CWA, specifically the term “waters of the United States”, in *Rapanos v. United States* and in *Carabell v. USACE*. As a consequence of the associated U.S. Supreme Court decisions, the USEPA and USACE, in coordination with the Office of Management and Budget and the CEQ, developed the *Clean Water Act Jurisdiction Following the U.S. Supreme Court’s Decision in Rapanos v. United States and Carabell v. United States Army Corps of Engineers Memorandum* (USEPA and USACE 2007a). This guidance requires a greater level of documentation to support an agency Jurisdictional Determination (JD) for a particular water body. As a result of these decisions, the agencies now assert jurisdiction over the following categories of water bodies: Traditional Navigable Waters (TNWs), all wetlands adjacent to TNWs, non-navigable tributaries of TNWs that are relatively permanent (i.e., tributaries that typically flow year-round or have continuous flow at least seasonally), and wetlands that directly abut such tributaries. In addition, the agencies assert jurisdiction over every water body that is not a Relatively Permanent Water if that water body is determined (on the basis of a fact-specific analysis) to have a significant nexus with a TNW.

The classes of water bodies that are subject to CWA jurisdiction only if such a significant nexus is demonstrated are: non-navigable tributaries that do not typically flow year-round or have continuous flow at least seasonally; wetlands adjacent to such tributaries; and wetlands adjacent to, but that do not directly abut, a relatively permanent, non-navigable tributary. A significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or an insubstantial impact on the chemical, physical, or biological integrity of a TNW. Principal considerations when evaluating significant nexus include the volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to a TNW, plus the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.

An additional memorandum regarding USEPA and USACE coordination on JDs under Section 404 of the CWA, in light of recent Supreme Court Decisions, was developed and signed (USEPA and USACE 2007b). Headquarters originally required the districts to request concurrence for only those JDs where the district was considering asserting jurisdiction over a non-navigable, intrastate, isolated water or wetland. The agencies now require that all JDs for non-navigable, isolated waters be elevated for USACE and USEPA Headquarters review prior to the district making a final decision on the JD.

### 3.6.2 Existing Conditions

Kirtland AFB lies at the intersection of four major North American biotic provinces: the Great Plains, Great Basin, Rocky Mountains, and Chihuahuan Desert. Vegetation and wildlife found within Kirtland AFB are influenced by each of these provinces, with the Great Basin being the most dominant influence. Elevations at Kirtland AFB range from approximately 5,200 feet amsl in the west to almost 8,000 feet amsl in the Manzano Mountains, providing a variety of ecosystems. Five canyons (i.e., the Lurance, Sol se Mete, Bonito, Otero, and Madera) are located in the eastern portion of the installation; a few smaller canyons occur in the Manzanita Mountains. Kirtland AFB is situated near three regional natural areas: the Sandia Mountain Wilderness Area, Sandia Foothills Open Space, and Rio Grande Valley State Park. The Sandia Mountain Wilderness Area, encompassing 37,877 acres, lies approximately 5 miles north of the eastern portion of the installation. This area is home to many species of plants and animals and supports an important raptor migration route (Kirtland AFB 2012a).

**Vegetation.** Four main natural plant communities occur on Kirtland AFB: grassland (includes sagebrush steppe and juniper woodlands), piñon-juniper woodlands, ponderosa pine woodlands, and riparian/wetland/arroyo. Grassland and piñon-juniper woodlands are the dominant vegetative communities at Kirtland AFB. The riparian/wetland/arroyo community is confined to drainages and isolated areas inundated by surface water during at least some part of the year. The ponderosa

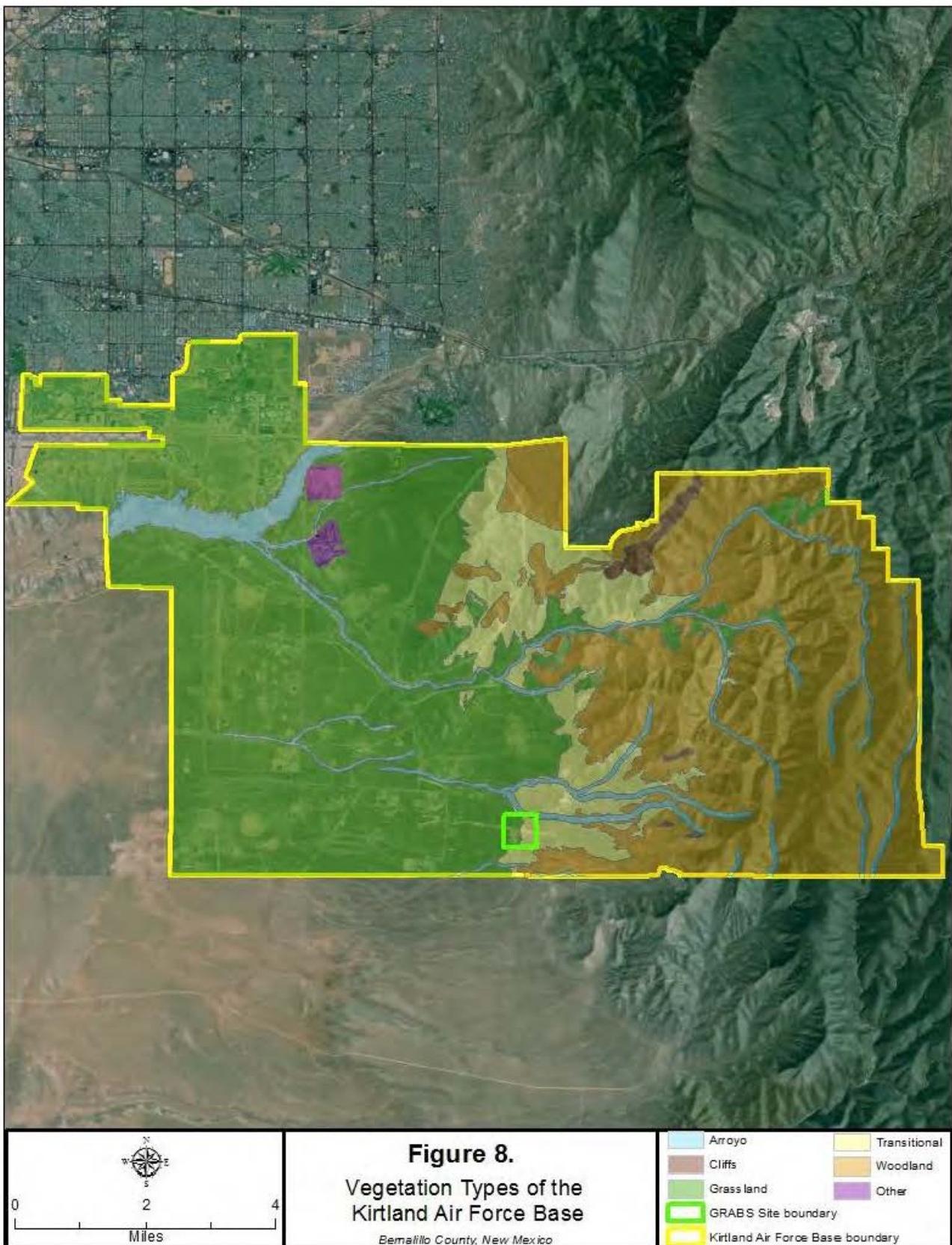
pine woodland community is found along the eastern boundary of the installation (Kirtland AFB 2012a). A further description of each plant community, as well as improved landscapes, is provided below.

- **Grassland Community.** This community is found between elevations of 5,200 and 5,700 feet amsl at Kirtland AFB. The grassland community at Kirtland AFB is further delineated into two sub-community types: sagebrush steppe in the western portion of the installation and juniper woodlands in the eastern portion. In the sagebrush steppe sub-community, the understory is less dense, with cryptogamic crust covering areas of exposed ground. The juniper woodland sub-community is similar to the grasslands to the east, except for the greater abundance of one-seeded juniper. The presence of this shrubby tree creates a savanna-like habitat in an otherwise treeless area. Juniper woodlands are found at a slightly higher elevation than the surrounding grassland. This habitat type provides a transition into piñon-juniper woodlands (Kirtland AFB 2012a).
- **Piñon-Juniper Woodland Community.** The piñon-juniper woodland community ranges in elevation from 6,300 to 7,500 feet amsl. This plant community is composed primarily of Colorado piñon pine and one-seeded juniper, with an understory of shrubs and grasses (Kirtland AFB 2012a).
- **Ponderosa Pine Woodland Community.** The ponderosa pine woodland community is typically found in the highest elevations of the eastern portion of the installation (i.e., between 7,600 to 7,988 feet amsl) (Kirtland AFB 2012a).
- **Riparian/Wetland/Arroyo Community.** The riparian/wetland/arroyo community consists of species that have a greater moisture requirement than species common to the other communities on the installation. These plant communities are found along the Tijeras Arroyo, Arroyo del Coyote, and at the various springs located throughout Kirtland AFB. Most of the small, scattered wetlands on Kirtland AFB are in good condition and occur in conjunction with other plant communities (Kirtland AFB 2012a).
- **Turf and Landscaped Areas.** Kirtland AFB promotes water conservation landscaping by using xeriscape methods combined with native plant materials in developed areas (Kirtland AFB 2012a).

**Figure 8** depicts the locations and extents of each plant community found at Kirtland AFB.

The GRABS Site, partially disturbed by past and ongoing test events, generally supports a grassland community, transitional to a more wooded, higher elevation plant community; an arroyo community is present in the northeastern corner of the Site, within a defined drainage swale (see **Figures 3 and 7**). Vegetation typical of this area includes broom snakeweed, Great Plains yucca, Indian ricegrass, purple three-awn, black grama, blue grama, hairy grama, six-weeks grama, four-wing saltbush, sand sage brush, winterfat, six-weeks three-awn, ring muhly, plains prickly-pear, spike dropseed, mesa dropseed, and Apache plume (Kirtland AFB 2012a).





**Wildlife Species and Habitat.** Wildlife management falls under the jurisdiction of the NMDGF and the USFWS (i.e., for migratory birds and federal-threatened and endangered species). Sensitive and protected species are addressed in this section under "Threatened and Endangered Species". Laws protecting wildlife include the ESA, MBTA, and the Bald and Golden Eagle Protection Act of 1940. Please refer to **Appendix D** for additional laws and regulations protecting wildlife and habitat.

Wildlife species found on Kirtland AFB are representative of the species' diversity common to the regional ecosystem (e.g., grassland, juniper woodland, piñon-juniper woodland, and ponderosa pine woodlands) and species common in grassland and semi-developed areas. Species can be transient and travel between communities, inhabit several communities, or exist in transitional areas between vegetation communities.

The GRABS Site lies within a somewhat disturbed area of Kirtland AFB, along the boundary of grassland and transitional (to woodland) plant communities. Common birds associated with such areas include European starling, American robin, band-tailed pigeon, rock dove, great-tailed grackle, and western burrowing owl (Kirtland AFB 2012a). Hawks, roadrunners, and quail are also common in these areas. Bird species that may utilize the nearby arroyo community include the western screech owl, broad-tailed hummingbird, plumbeous vireo, western tanager, northern oriole, rufous-sided towhee, and song sparrow (Kirtland AFB 2012a).

The local mammal community is dominated by rodents, rabbits, and hares. These include the desert cottontail, black-tailed jack rabbit, spotted ground squirrel, Gunnison's prairie dog, silky pocket mouse, Ord's kangaroo rat, banner-tailed kangaroo rat, Merriam's kangaroo rat, western harvest mouse, deer mouse, white-footed mouse, and northern grasshopper mouse. Mammalian predators found in association with these species include the coyote, badger, kit fox, striped skunk, and bobcat (Kirtland AFB 2012a).

Reptiles found in the vicinity of the GRABS Site include the western box turtle, little striped whiptail lizard, short-horned lizard, lesser earless lizard, bull snake, western rattlesnake, and glossy snake. Many of these species have extensive periods of dormancy during dry conditions and rapid breeding cycles when temporary ponds occur after rains (Kirtland AFB 2012a).

**Threatened and Endangered Species.** The agencies that have primary responsibility for the conservation of plant and animal species in New Mexico are the USFWS and the NMDGF. These agencies maintain lists of plant and animal species that have been classified, or are potential candidates for classification, as threatened or endangered in Bernalillo County. Of those species known to occur in the county, one state threatened species, two federal species of concern, and one rare plant have the potential to occur on Kirtland AFB; no threatened or endangered species have been identified at the GRABS Site.

- **Gray vireo.** The gray vireo, a state threatened species, occurs on the installation, but has not been encountered on or near the GRABS Site. The USFWS considers this bird a sensitive species. In 2003, an installation-wide gray vireo survey was conducted in which 53 territories were mapped, none of which included the GRABS Site (Kirtland AFB 2004a). Territories were found throughout the piñon-juniper woodland community in an elevation belt of 5,850 to 6,600 feet amsl. Gray vireos occupied areas with an open canopy (i.e., less than 25 percent canopy cover) with one-seeded juniper as the dominant tree/shrub species (Kirtland AFB 2012a). No suitable gray vireo habitat exists or has been identified at the GRABS Site; however, gray vireos may periodically visit the GRABS Site due to this Site's close proximity to suitable gray vireo habitat to the northeast and southeast (Frei 2008).

- **Western burrowing owl.** The western burrowing owl, a federal species of concern, is a common resident at Kirtland AFB. It is very closely associated with prairie dog colonies on the installation, as the owls use abandoned prairie dog burrows for nesting during the summer months. Burrowing owls are present on the installation from March through October before migrating south, although a few birds might occur on the installation during mild winters. Burrowing owl inventories have been conducted on the installation every year since 1994. The 2012 survey identified seven breeding pairs of burrowing owls and one lone male; six of these pairs and the lone male were observed within the cantonment area, and one breeding pair was located in the grasslands adjacent to the landfill (Envirological Services, Inc. 2012). No burrowing owls have been reported from the GRABS Site during these annual investigations.
- **Mountain plover.** The mountain plover, a federal species of concern, is not known to occur on Kirtland AFB. However, in 2003, an adult with two chicks was observed just south of the installation on the Isleta Pueblo Indian Reservation (Kirtland AFB 2004a). Appropriate nesting habitat for this species is limited on the installation; therefore, it is unlikely that the mountain plover uses Kirtland AFB during the nesting season. No mountain plovers have been reported on the GRABS Site during these prior investigations.
- **Santa Fe milkvetch.** Santa Fe milkvetch is a rare plant found on gravelly hillsides in piñon-juniper woodland or plains-mesa grassland (5,100 to 6,000 feet amsl) (New Mexico Rare Plant Technical Council 1999). Santa Fe milkvetch (is expected to occur on Kirtland AFB (Kirtland AFB 2008b); however, the NMDGF expressed no concern regarding this species being encountered at the GRABS Site during the scoping process (see **Appendix E**).

**Critical Habitat.** Critical habitats are those areas of land, air, or water that are essential for maintaining or restoring threatened or endangered plant or animal populations. Neither the NMDGF nor the USFWS has designated or identified any critical habitat on Kirtland AFB. Surveys and literature indicate that important habitats on the installation include wetlands, which are rare in this region, providing water in an otherwise arid environment. Other important habitats on the installation include prairie dog towns, which provide nesting habitat for the burrowing owl, and areas between 5,900 and 6,600 feet amsl containing open juniper woodlands, which are used as nesting habitat by the gray vireo (Kirtland AFB 2012a). No critical habitat has been identified at the GRABS Site.

**Wetlands.** Wetlands provide an important function in recharging aquifers and buffering streams by filtering sediment and nutrients. Wetlands have been defined by agencies responsible for their management. The term “wetland” as used herein, is defined using USACE conventions. The USACE has jurisdiction to protect wetlands under Section 404 of the CWA in accordance with the following definition:

...areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR §328.3[b]). Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands have three diagnostic characteristics that include: (1) over 50 percent of the dominant species present must be classified as obligate, facultative wetland, or facultative, (2) the soils must be classified as hydric, and (3) the area is either permanently or seasonally inundated, or saturated to the surface at some time during the growing season of the prevalent vegetation (USACE 1987).

Wetlands are considered "waters of the United States" if they are determined to be jurisdictional by the USACE and USEPA. There are several wetlands on Kirtland AFB; however, no JDs have been made concerning these water features.

There are no wetlands on or near the GRABS Site (see **Figures 6 and 7**). **Figure 7** shows that the drainages and arroyos in close proximity to the GRABS Site convey water westward, away from the foothills of the Manzanita Mountains, but do not transport that water to any other surface water body or larger river network. As such, these drainages are not anticipated to be jurisdictional "waters of the United States". However, no JDs have been made to confirm this conclusion.

## 3.7 Cultural Resources

### 3.7.1 Definition of the Resource

Cultural resources include prehistoric and historic archaeological sites, structures, districts, or areas containing physical evidence of human activity. These resources are protected and identified under several federal laws and EOs. Federal laws include the NHPA, the Archaeological and Historic Preservation Act, the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. Please refer to **Appendix D** for further descriptions of these regulations.

The NHPA requires that federal agencies assume the responsibility for the preservation of historic and prehistoric resources located on lands owned or controlled by that agency. Section 110 (a)(2) of the NHPA requires that "...each federal agency shall establish a program to locate, inventory, and nominate to the Secretary all properties under the agency's ownership or control...that appear to qualify for inclusion on the National Register...". Section 110 (a)(2) further requires that "each agency shall exercise caution to assure that any property that might qualify for inclusion is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly". These requirements are also included in DOD Directive 4710.1.

Under NHPA guidelines, cultural resources, including buildings, structures, objects, sites, and districts, are to be evaluated for National Register of Historic Places (NRHP) eligibility using NRHP Criteria for Evaluation, as listed in 35 CFR §60.4. To be listed in, or considered eligible for the NRHP, a cultural resource generally must be 50 years or older and meet at least one of the following four criteria:

- The resource is associated with events that have made a significant contribution to the broad pattern of history (Criterion A).
- The resource is associated with the lives of people significant in the past (Criterion B).
- The resource embodies distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components might lack individual distinction (Criterion C).
- The resource has yielded, or could likely yield, information important in prehistory or history (Criterion D).

In addition to meeting at least one of the above criteria, a cultural resource must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics it possessed in the past and its capacity to convey information about a culture or group of people, a historic pattern, or a specific type of architectural or engineering design or technology. Location refers to the place where an event occurred or a property was originally built.

Design considers elements such as plan, form, and style of a property. Setting is the physical environment of the property. Materials refer to the physical elements used to construct the property. Workmanship refers to the craftsmanship of the creators of a property. Feeling is the ability of the property to convey its historic time and place. Association refers to the link between the property and a historically significant event or person.

Cultural resources meeting these standards (i.e., age, eligibility, and integrity) are termed “historic properties” under the NHPA. Sites or structures that are not considered individually significant can be considered eligible for listing in the NRHP as part of a historic district. According to the NRHP, a historic district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects that are historically or aesthetically united by plan or physical development.

Typically, cultural resources are grouped into three separate categories: archaeological, architectural, or sites that have a traditional religious or cultural significance to Native American Tribes. Archaeological resources are defined as areas that have altered the landscape. Architectural resources are built structures of significance. In general, these architectural resources are typically more than 50 years old, but newer structures can be evaluated under the above four criteria. Resources of traditional, religious, or cultural significance to Native American Tribes can include architectural or archaeological resources, sacred sites, neighborhoods, geographic landmarks, flora or faunal habitats, mineral localities, or sites considered essential for the preservation of traditional culture.

The NEPA process requires the assessment of potential impacts on cultural resources. In addition, under Section 106 of the NHPA, federal agencies must take into account the impact of their undertakings on historic properties and allow the Advisory Council on Historic Preservation an opportunity to comment. Under this process, the federal agency evaluates the NRHP eligibility of resources within the proposed undertaking’s APE and assesses the possible impacts of the proposed undertaking on historic properties in consultation with the SHPO and other parties. The APE is defined as the geographic area(s) “within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist”. Under Section 110 of the NHPA, federal agencies are required to establish programs to inventory and nominate to the NRHP cultural resources under their purview.

### 3.7.2 Existing Conditions

**Archaeological Resources.** There have been more than 150 cultural resources projects undertaken at Kirtland AFB. These projects have resulted in the identification of 661 archaeological sites and the NRHP evaluations of more than 2,000 historic properties. Of the 661 archaeological sites recorded within the boundaries of Kirtland AFB, most are in the eastern portion of the installation. Laboratory of Anthropology numbers have been assigned to each of these archaeological sites. NRHP eligibility evaluations are generally complete for the sites located on the lower piedmonts and drainages of the western portions of Kirtland AFB and the eastern Manzanita Mountains. The portion of Kirtland AFB containing the GRABS Site has been identified as having a moderate potential to overlay buried cultural deposits. For this analysis, the GRABS Site is considered the APE.

**Architectural Resources.** The only quasi-permanent structures on the Site are the subsurface GRABS installed in 1971, and the HST-20 installed in 1984. The other onsite structures are temporary in nature, more modern, and generally removed after the specific testing program is completed. None of the onsite structures is over 50 years of age.

**Traditional Cultural Properties.** While traditional cultural properties have been identified on Kirtland AFB, no traditional cultural properties or sacred sites have been identified within the APE.

## 3.8 Infrastructure

### 3.8.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure information in this section was primarily obtained from the Kirtland AFB General Plan and provides a brief overview of each infrastructure component and comments on its existing general condition.

The infrastructure components discussed in this section include transportation, utilities, and solid waste management. Transportation is defined as the system of roadways, highways, and transit services that are in the vicinity of the GRABS Site and could be reasonably expected to be potentially affected by the Proposed Action. Utilities include electrical, natural gas, liquid fuel, water supply, sanitary sewage/wastewater, storm water handling, and communications systems. Solid waste management primarily relates to the availability of landfills to support a population’s residential, commercial, and industrial needs.

### 3.8.2 Existing Conditions

**Transportation.** Numerous modes of transportation are available at Kirtland AFB, including air, mass transit, and federal and state highway access. The Albuquerque International Sunport, located along the western boundary of the installation, provides commercial and public aviation and military support, particularly for USAF and Air Force Reserve units. The Albuquerque International Sunport airfield has three commercial carrier runways and one runway dedicated to general aviation (City of Albuquerque 2002). The Albuquerque Transit Department, ABQ RIDE, provides and operates public bus services throughout the city. Several bus routes regularly service Kirtland AFB (ABQ RIDE 2012).

Kirtland AFB is situated approximately 4 miles east of Interstate 25 and approximately 1.5 miles south of Interstate 40. The installation is served from interstate highways and many state and local roads. The city of Albuquerque street grid includes a number of major arterials that tie directly into Kirtland AFB, including Eubank, Wyoming, Louisiana, San Mateo, and Carlisle Boulevards. These roadways serve north-south traffic flows. The east-west trending major arterial directly to the north of the installation is Gibson Boulevard. Other east-west arterials north of the installation include Zuni Boulevard and Central Avenue, the historic Route 66 (Kirtland AFB 2011).

There are currently six gated entrances from the city of Albuquerque to Kirtland AFB: Carlisle Gate at the extension of Carlisle Boulevard, Truman Gate at Truman Street, Gibson Gate at the intersection of Gibson and Louisiana Boulevards, Wyoming Gate at Wyoming Boulevard, and Eubank Gate at the extension of Eubank Boulevard. The sixth gate is South Valley Gate, which is located at Ira Sprecker Road south of the Albuquerque International Sunport. The Carlisle, Wyoming, Eubank, and South Valley Gates currently have restricted hours due to reduced security manpower and lighter usage (Kirtland AFB 2011).

There are approximately 429 miles of paved roads and 229 miles of unpaved roads on Kirtland AFB. Major arterials include Wyoming Boulevard, Gibson Boulevard, and Frost Street. Hardin Boulevard and Aberdeen Avenue are major arterials in the east and west portions of the installation, respectively. Minor arterials include Pennsylvania Street and 20th Street, which serve the SNL facilities. The primary transportation route to the southern portion of the installation is via Pennsylvania Street (Kirtland AFB 2011).

The GRABS Site is transected and accessed by Target Road, a paved, two-lane roadway extending roughly west to east across the Site. Target Road provides connectivity between SNL facilities in the southern portion of the installation and the more developed portion of the installation, via Pennsylvania Street. A small network of unnamed, unpaved site access roads and trails extends throughout the GRABS Site, providing access to existing onsite testing and training facilities (see **Figure 3**).

Traffic associated with ongoing operations at the GRABS Site includes up to 12 vehicles per test event. These vehicles serve the up to 30 personnel associated with each test event. Annually, approximately 20 test events occur at the GRABS Site, with each test event lasting, on average, 4 days. These vehicles contribute a negligible percentage to local traffic volumes. On an average weekday, over 30,000 vehicles travel to and from Kirtland AFB; the approximate number of vehicles falls to 9,400 on an average weekend (Kirtland AFB 2013c).

**Electrical System.** Kirtland AFB purchases electrical power from the Western Area Power Administration. All electricity to the installation comes through the Sandia Switching Station on an approximately 80 million-volt-amperes (VA) capacity electrical circuit. The estimated historical maximum electrical load is approximately 79 million VA (Kirtland AFB 2011).

An existing overhead electrical power line extends onto the GRABS Site. This overhead line, while terminating at a utility pole instead of an existing structure, is capable of transmitting up to 2,400 volts of electricity (see **Figure 3**). No active electrical lines currently feed into the GRABS Site.

**Natural Gas and Propane.** Coral Energy supplies Kirtland AFB with natural gas. There are approximately 70 miles of natural gas mains at Kirtland AFB that provide natural gas service to select buildings on the installation. Rural portions of the installation do not receive natural gas service and rely on propane, which is delivered to and stored in local propane storage tanks (Kirtland AFB 2011).

A solar-powered generator with a propane canister for back-up is present on the GRABS Site (see **Figure 3**). No natural gas service lines currently extend to the GRABS Site.

**Liquid Fuel.** Liquid fuels are supplied to Kirtland AFB by contractors. The primary liquid fuels supplied include JP-8 (jet propellant [fuel] – type 8), diesel, and unleaded gasoline. Fuels are purchased in bulk, delivered to the installation by tanker truck, and stored in various-sized storage tanks across the installation. Liquid fuels at Kirtland AFB are primarily used to power military aircraft and ground-based vehicles (Kirtland AFB 2011).

No liquid fuel is currently stored on the GRABS Site.

**Water Supply System.** Water is supplied to Kirtland AFB by six groundwater wells and two separate, but interconnected, distribution systems that have a collective water-pumping maximum capacity of 9.3 million gallons per day (MGD). Kirtland AFB pumps an average of 5.5 MGD of treated, potable water through 160 miles of distribution mains. There are also approximately 50 miles of non-potable water pipeline serving the Tijeras Golf Course and providing water for fire protection.

In 1973, a court decreed that Kirtland AFB has the right to withdraw up to 6,000 acre-feet per year from the underground aquifer, which is equal to approximately 2 billion gallons of water (Kirtland AFB 2011). In 2012, Kirtland AFB pumped a total of 877 million gallons (2,693 acre-feet) of water from these wells (Kirtland AFB 2013b).

Kirtland AFB can also purchase water from the city of Albuquerque to meet demand during peak periods; however, the amount of water purchased from the city has been negligible since 1998, and Kirtland AFB did not purchase any water from the city in 2012 (Kirtland AFB 2013b).

No water infrastructure currently exists at the GRABS Site.

**Sanitary Sewer/Wastewater System.** Kirtland AFB does not have its own sewage treatment plant. Instead, the sanitary sewer system of Kirtland AFB, which consists of approximately 92 miles of collection mains, transports wastewater to the city of Albuquerque treatment facility. Kirtland AFB discharges an average of approximately 1.2 MGD; this average includes “effluents from Kirtland AFB laboratories, aircraft maintenance facilities, and production operations, as well as discharges from installation washrooms and personnel housing” (Kirtland AFB 2011). Some facilities in remote areas and other portions of the installation are not serviced by the sanitary sewer system; these facilities use isolated, onsite septic systems to dispose of wastewater (Kirtland AFB 2011).

The GRABS Site is not currently connected to the public sanitary sewer/wastewater system and does not have a septic system. As shown in **Figure 3**, a portable latrine is present on the GRABS Site for use during test events. The portable latrine is emptied by a contracted service on an as-needed basis.

**Storm Water System.** Man-made storm water drainage systems, which include gutters, culverts, ditches, and underground piping, direct storm water to receiving channels and basins in developed portions of Kirtland AFB. Kirtland AFB has a NPDES General Storm Water Permit for industrial activities and an active program for construction projects that require a NPDES permit. In less-developed portions of Kirtland AFB, man-made storm water drainage systems have not yet been installed and storm water drains by sheet flow to various natural drainageways. Most storm water at Kirtland AFB that does not get absorbed into the ground drains into the Rio Grande, which eventually discharges into the Gulf of Mexico (Kirtland AFB 2011).



Storm water runoff at the GRABS Site flows through natural drainage patterns created by natural terrain and paved surfaces. Natural drainage swales are present to the north and south of the GRABS Site (see **Figure 3**); man-made drainage ditches are present along Target Road, and serve to convey runoff to the natural systems.

**Solid Waste Management.** Solid waste generated at Kirtland AFB is collected by a contractor and disposed of at the city of Albuquerque's Cerro Colorado Landfill. The Cerro Colorado Landfill receives approximately 2,100 tpy from Kirtland AFB.

Kirtland AFB operates a construction and demolition waste-only landfill on the installation. This landfill accepts only construction and demolition waste from permitted contractors working on the installation, has a total gross capacity of 10.2 million cubic yards, and has a net waste capacity of 7.2 million cubic yards. As of 31 December 2012, the remaining capacity of this landfill was almost 5 million cubic yards. In 2011 and 2012, an average of 25,200 tons of construction and demolition waste per year was deposited in this landfill; of that total, Kirtland AFB generated an average of 16,250 tons. As of June 2012, the recycling of construction and demolition waste at Kirtland AFB has been codified into the Construction Waste Management specification (Section 01 74 19) for all construction and de-construction projects on the installation.

Kirtland AFB manages a recycling program to reduce the amount of solid waste sent to landfills. The installation recycles scrap metal under the Qualified Recycling Program and collects

corrugated cardboard from over 70 drop-off points across the installation. Per the DOD Strategic Sustainability Performance Plan, the diversion rate goal is 60 percent by FY 2015 and thereafter through FY 2020.

## 3.9 Hazardous Materials and Wastes

### 3.9.1 Definition of the Resource

Hazardous materials are defined by 49 CFR §171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR §172.101), and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 USC §6903(5), as amended by the Hazardous and Solid Waste Amendments, as: “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in, mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed”. Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected as part of waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). USEPA is given authority to regulate these special hazard substances by the Toxic Substances Control Act (TSCA) (15 USC Chapter 53). USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR Part 763, with additional regulations concerning emissions at 40 CFR Part 61. Whether from LBP abatement or other activities, depending on the quantity or concentration, the disposal of the LBP waste is regulated by the RCRA at 40 CFR Part 260. The disposal of PCBs is addressed in 40 CFR Parts 750 and 761. The presence of special hazards, including describing their locations, quantities, and condition, assists in determining the significance of a proposed action.

The DOD developed the Environmental Restoration Program (ERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations (i.e., active installations, installations subject to Base Realignment and Closure, and Formerly Used Defense Sites). The Installation Restoration Program and the Military Munitions Response Program (MMRP) are components of the ERP. The Installation Restoration Program required each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addressed non-operational rangelands that are suspected or known to contain UXO, discarded military munitions, or munitions constituent contamination. A description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in the identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contamination plume has been completed).

The U.S. Department of Energy (DOE) developed the Office of Environmental Restoration and Waste Management in 1989. The goal of this office is to implement the DOE's policy of ensuring that DOE's past, present, and future operations do not threaten human health or environmental health and safety. The Environmental Management Office was reorganized in 1999 to implement procedures to meet these goals through five underlying offices. The Office of Site Closure is responsible for achieving closure of ER sites in a manner that is safe, cost-effective, and coordinated with stakeholders. As a facility operated for DOE under the Albuquerque Operations Office, SNL is part of this program. The current investigation being conducted at SNL under the ER program is intended to determine the nature and extent of hazardous and radioactive contamination and to restore any sites where such materials pose a threat to human health or the environment.

For the USAF, Air Force Policy Directive 32-70, *Environmental Quality*, and Air Force Regulation 32-7000 series incorporate the requirements of all federal regulations and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards.

### 3.9.2 Existing Conditions

**Environmental Management System.** Kirtland AFB has implemented an EMS program in accordance with International Organization for Standardization 14001 Standards; EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*; and AFI 32-7001, *Environmental Management*. The EMS policy prescribes to protect human health, natural resources, and the environment by implementing operational controls, pollution prevention environmental action plans, and training. The GRABS Site is part of DTRA and is required to meet the EMS policy, aspects, targets, and objectives. Personnel at the GRABS Site are required to complete the EMS Awareness training provided through the International Center for Leadership Development. The EMS program and associated training is managed by the 377 MSG/CEIE EMS Coordinator.

**Hazardous Materials and Petroleum Products.** AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF to be in compliance with the Emergency Planning and Community Right to Know Act. AFI 32-7086 applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities.

Kirtland AFB has identified the 377 MSG/CEIE as the responsible entity to oversee hazardous material tracking on Kirtland AFB. Part of their responsibilities is to control the procurement and use of hazardous materials to support USAF missions, ensure the safety and health of personnel and surrounding communities, and minimize USAF dependence on hazardous materials. 377 MSG/CEIE is charged with managing hazardous materials to reduce the amount of hazardous waste generated on Kirtland AFB in accordance with the Kirtland Hazardous Waste Management Plan (HWMP) (Kirtland AFB 2004b).

Hazardous materials and petroleum products, though used at the GRABS Site (see **Section 1.1.5.8**), are not stored at the GRABS Site. Such materials are brought to the Site on an as-needed basis for specific test events, and are managed in accordance with AFI 32-7086, working closely with 377 MSG/CEIE as overseen by DTRA.

**Hazardous and Petroleum Wastes.** The USAF maintains a HWMP (Kirtland AFB 2004b) as directed by AFI 32-7042, *Waste Management*. This plan describes the roles and responsibilities of all entities at Kirtland AFB with respect to the waste stream inventory, waste analysis plan,

hazardous waste management procedures, training, emergency response, and pollution prevention. The HWMP establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management.

Kirtland AFB is a large-quantity generator of hazardous waste (Handler Identification #NM9570024423). Currently, there are no hazardous or petroleum wastes produced at the GRABS Site due to ongoing testing and training activities. As no radioactive materials or hazardous or toxic chemicals are used at this location, no soil or water contamination currently occurs due to current operation of the GRABS Site.

Personnel at the GRABS Site have available the Hazardous Material Emergency Planning and Response Plan (Kirtland AFB 2008a) and Spill Prevention, Control, and Countermeasures Plan (Kirtland AFB 2009b) during all onsite testing and training events.

**Environmental Restoration Program.** A review of the *Kirtland Air Force Base, Albuquerque, New Mexico Comprehensive Site Evaluation Phase I Report, Air Force Military Munitions Response Program*, verified that the GRABS Site is not within or adjacent to any surface danger zone associated with existing defense ranges or munitions response areas (USACE 2007).

As described in **Section 1.1.4**, prior to its development in 1971, the area was used by the U.S. Army during 1944 and 1945 as an impact range for artillery practice. In the early 1950s, SNL used the Site for proximity-fuse testing. Since that time, the GRABS Site has been swept by EOD teams and remediated for potential depleted uranium. However, a chance for encountering buried ordnance still exists on the GRABS Site. All personnel using the Site are given an UXO safety brief prior to going onsite; the Kirtland AFB EOD team is notified and removes or detonates in-place any identified UXO. Artillery rounds (105 mm) have been found on and removed from the GRABS Site as recently as 2012.

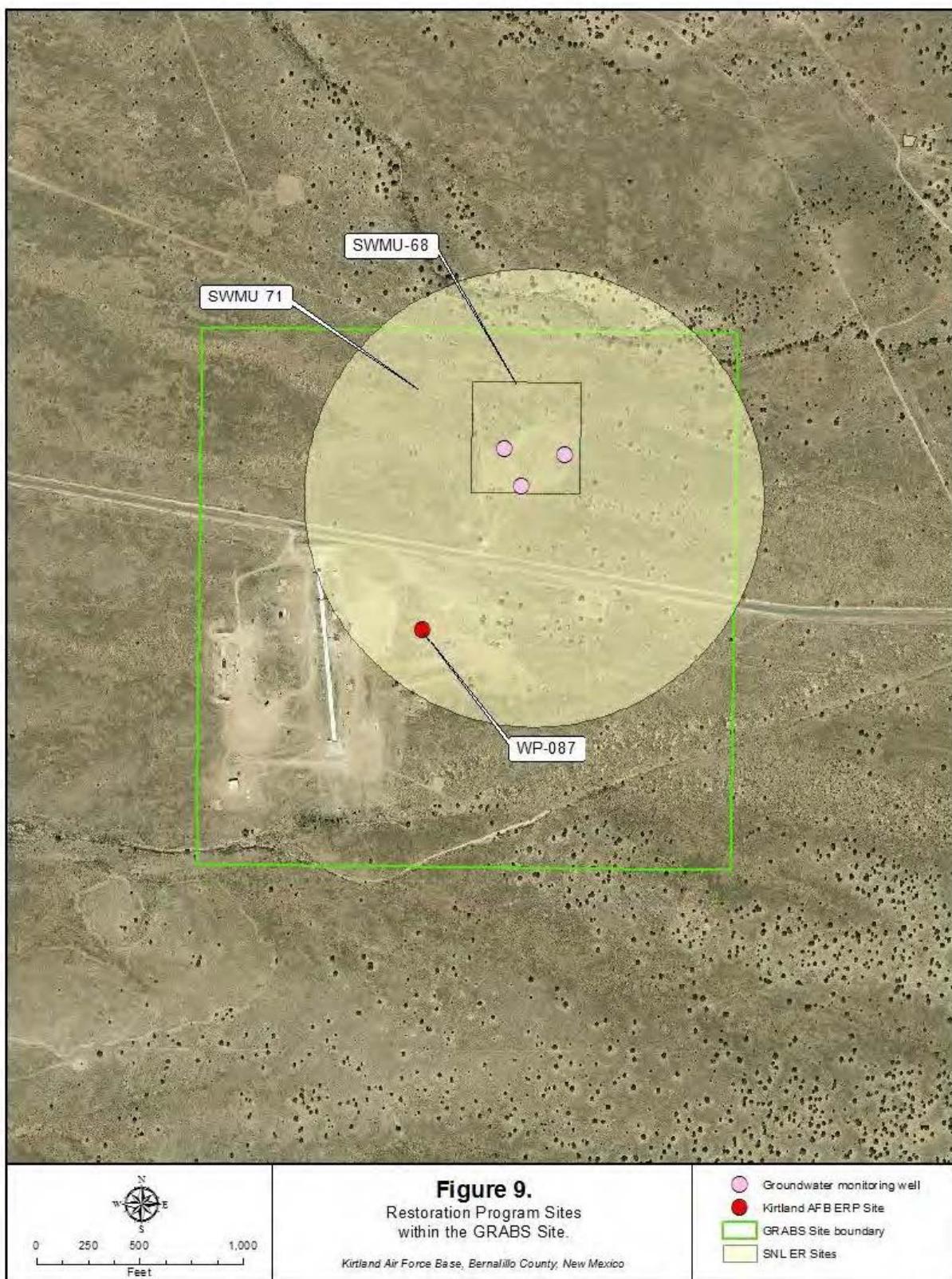
Based on available data, there are one Kirtland AFB ERP and two SNL ER sites located within the boundary of the GRABS Site, described as follows:

- **Kirtland AFB ERP Site WP-087 – GRABS Site Waste Pile.** Located to the east of the HST-20, WP-087 consisted of approximately 4 cubic yards of total petroleum hydrocarbon-(TPH-) affected gravelly soil and 30 cubic yards of concrete and other debris. The soil was likely contaminated due to an onsite spill. The elevated levels of TPH were identified in 1995, and the waste pile, TPH-affected soils, and underlying soils (i.e., approximately 288 total cubic yards) were removed from the Site in 1998. After further confirmatory soil sampling, the NMED determined that WP-087 appeared eligible for No Further Action (NFA) status. In June 2005, the NMED identified that WP-087 had been characterized and remediated in accordance with applicable state or federal regulations, and that available data indicated that any residual contaminants posed an acceptable level of risk under current and projected future land use of the GRABS Site (i.e., NMED Criterion 5) (Kirtland AFB 2005). In June 2006, the NMED granted final permit approval for NFA status to WP-087 (NMED 2006). **Figure 9** depicts the location of WP-087 within the GRABS Site
- **SNL ER Site SWMU-71 – Moonlight Shot Area.** Located in the northern half of the GRABS Site, SWMU-71 encompasses approximately 83.1 acres and includes SNL ER Site SWMU-68. Between 1956 and 1961 tests were conducted to simulate the extent of radioactive fallout dispersion from a nuclear weapon detonation during a transport accident or an accidental detonation during assembly. Asphalt and concrete pads that may have been associated with the tests are located on the north side of Target Road. Two separate fallout studies were documented: Project 56, conducted in 1956, and Moonlight Shot, conducted from May 1960 to April 1961. The Project 56 shots used HE spheres that

contained 300 pounds of HE and approximately 3 pounds of depleted uranium in aluminum casings, simulating a generic nuclear device. These uncontained tests were performed with mock weapons and did not produce a nuclear yield, but the depleted uranium was dispersed over a large area. All HE used in the testing would have been expended in the detonation leaving no residue. The shots were designed to investigate the importance of point-of-detonation, height-of-burst, and burst environment, representing the variety of accidental detonations that could occur. Nine shots were proposed for Project 56; however, only four shots were confirmed. Plans for the Moonlight Shot series called for 300 pounds of HE and 66 pounds of depleted uranium. Part of the Moonlight Shot program called for using fallout cloud sampling instruments borne by mortar shells. These instruments would allow for “coring of the fallout cloud” both during development and after stabilization. This series was also designed to test the influence of paved surfaces upon particulate dispersion in the cloud by detonating mock weapons on or near an asphalt pad to simulate a city street and a concrete pad to simulate an airport tarmac. Approximately 21 tests were planned; however, none of the tests have been confirmed and it is believed no tests in the Moonlight Shot series were performed. In November 1993, Kirtland AFB EOD conducted a surface UXO and HE survey of the site in conjunction with SWMU-68. No live ordnance or HE was discovered but expended ordnance debris was found. In December 1993, a surface radiation survey was conducted and 5 area-source and 238 point-source anomalies were detected. The point-source anomalies were determined to be fragments of depleted uranium that remained on the surface from the test activities and thorium fragments related to burn testing activities conducted at SWMU-68. Removal of the depleted uranium and thorium fragments was conducted as a voluntary clean up. Los Alamos National Laboratory conducted a radiation survey of the site and no widespread low-level radiation contamination was detected. In July 2000, the NMED granted final permit approval for NFA status to SWMU-71 (SNL 1996). **Figure 9** depicts the location of SWMU-71 within the GRABS Site

- **SNL ER Site SWMU-68 – Old Burn Site.** Located in the northeastern portion of the GRABS Site, SWMU-68 encompasses approximately 6.5 acres and was used to conduct pool fire tests from 1965 to 1978. The purpose of the pool fire tests was to study the effects of fire on weapons components and to determine the potential for release of radioactive material in case of a transportation (air, truck, and rail) accident. The primary fuel used for the pool fire tests was jet fuel. The Old Burn Site consisted of an aboveground, approximately 3-feet deep, steel burn pool; a drainage ditch; an overflow basin; a rectangular burn pit that was once lined with plastic; three debris piles; and two irregularly shaped borrow pits. Between 1995 and 2004, multiple surveys and remediation projects were conducted at SWMU-68 to identify and remove nonhazardous and hazardous materials from the site. Wastes removed from SWMU-68 included soil contaminated with radionuclides and metals (primarily lead), assorted metal fragments, scrap metal, concrete, wire, scrap wood, cardboard, plastic fencing, and burn debris. All testing materials and features were removed and the area was graded and reseeded in 2004. Approximately 425 cubic yards of lead-contaminated soil, 3 cubic feet of radiologically contaminated soil, and 120 cubic yards of construction debris were subsequently removed from SWMU-68. Confirmatory soil sampling was conducted in 2004 to validate the results of the soil removal activities. Three groundwater monitoring wells were installed in August 2011 and quarterly sampling began in October 2011. During the drilling of the three groundwater monitoring wells, groundwater was encountered at depths ranging from approximately 135 to 240 feet bgs. No contaminants were detected within the groundwater above established maximum contaminant levels. The eighth and final sampling event required by NMED for these monitoring wells was completed in July 2013; however, quarterly groundwater sampling and reporting will continue at SWMU-68 until additional guidance is provided by NMED (SNL 2014). **Figure 9** depicts the location of SWMU-68 within the

GRABS Site.



DTRA does not conduct testing or training operations on the GRABS Site north of Target Road; this area is only used by DTRA to position sensors to monitor and record data from onsite test events. The photograph to the right shows current sensors on the northern portion of the GRABS Site, with Target Road and the HST-20 in the background to the southwest.



**Asbestos-Containing Material.** Asbestos is regulated by the USEPA under the CAA, TSCA, and the Comprehensive Environmental Response, Compensation, and Liability Act.

USEPA has established that any material containing more than 1 percent asbestos is considered an ACM. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Non-friable ACM is any ACM that does not meet the criteria for friable ACM. Guidelines and procedures for record-keeping, removal, encapsulation, enclosure, and repair activities associated with ACM-abatement projects are conducted in accordance with all federal, state, and local rules and regulations.

The practice of using ACM in building construction was largely phased out during the 1970s and 1980s. The oldest test structure at the GRABS Site is the GRABS. The GRABS was constructed in 1971; the HST-20 was constructed in 1984. All other onsite structures were installed after 1984. Based on available data provided by DTRA, none of the onsite structures contain ACM, as ACM was not required to construct test structures such as the GRABS or HST-20. As such, ACM is not anticipated to be present at the GRABS Site.

**Lead-Based Paint.** Federal agencies are required to comply with applicable federal, state, and local laws related to LBP activities and hazards. With the passing of the Consumer Product Safety Act in 1977, the Federal Government required all paint manufactured after February 1978 to be below a maximum amount of 0.06 percent lead by weight for use in commercial and residential facilities. Any paint with amounts of lead exceeding the 0.06 percent threshold is considered LBP. The USAF incorporated the Consumer Product Safety Act into Air Force Manual 85-3, *Paints and Protective Coatings*, in 1981 (Headquarters Air Force Materiel Command 2000).

The only structure on the GRABS Site constructed prior to 1978 is the GRABS. The GRABS, a subsurface test structure, is not painted. Therefore, LBP is not anticipated to be present at the GRABS Site.

**Polychlorinated Biphenyls.** PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the United States throughout the 1950s and 1960s. PCBs can be present in products and materials produced before the 1979 ban. Common products that might contain PCBs include electrical equipment (e.g., transformers and capacitors), hydraulic systems, and fluorescent light ballasts.



The oldest existing onsite test structure at the GRABS Site was constructed in 1971, but this structure does not contain any transformers or fluorescent light ballasts. The age of the onsite transformers shown in **Figure 3** is unknown. However, these transformers appear to be relatively new and are not anticipated to contain PCBs. As such, no PCBs are expected to be present at the GRABS Site.

**Radiological Materials.** Radiological materials are not used at the GRABS Site. As described above, the GRABS Site has been cleared of depleted uranium from historic, pre-DTRA Site uses, prior to the establishment of the GRABS.

## 3.10 Safety

### 3.10.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety address workers' and public health and safety during and after construction, de-construction, testing, and training activities.

Site safety requires adherence to regulatory requirements imposed for the benefit of employees and the public. Site safety includes implementation of engineering and administrative practices that aim to reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DOD and military requirements, the amount and type of training required for workers, the use of personal protective equipment (PPE), administrative controls, engineering controls, and permissible exposure limits for workplace stressors.

Health and safety hazards can often be identified and reduced or eliminated before an activity begins. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself, together with the exposed (and possibly susceptible) population or public. The degree of exposure depends primarily on the proximity of the hazard to the population. Hazards include transportation, maintenance, and repair activities, and the creation of a noisy environment or a potential fire hazard. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments due to noise or fire hazards for nearby populations. Noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

### 3.10.2 Existing Conditions

**Contractor Safety.** All contractors performing construction and de-construction activities at Kirtland AFB are responsible for following federal and state safety regulations and are required to conduct construction and de-construction activities in a manner that does not increase risk to workers or the public.

New Mexico is one of several states that administers their own occupational safety and health (OSH) program according to the provision of the federal OSHA of 1970, which permits a state to administer its own OSH program if it meets all of the federal requirements regarding the program's structure and operations. The New Mexico Occupational Health and Safety Bureau program has the responsibility of enforcing Occupational Health and Safety Regulations within New Mexico. Its jurisdiction includes all private and public entities such as city, county, and state government employees. Federal employees are excluded as they are covered by federal OSHA regulations.

OSH programs address the health and safety of people at work. OSH regulations cover potential exposure to a wide range of chemical, physical, and biological hazards, and ergonomic stressors. The regulations are designed to control these hazards by eliminating exposure to the hazards via administrative or engineering controls, substitution, or use of PPE. OSH is the responsibility of each employer, as applicable. Employer responsibilities are to review potentially hazardous workplace conditions; monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous

substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and ergonomic stressors; recommend and evaluate controls (e.g., prevention, administrative, engineering, PPE) to ensure exposure of personnel is eliminated or adequately controlled; and ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to the use of respiratory protection, engaged in hazardous waste work, asbestos, lead, or other work requiring medical monitoring.

**Military Personnel Safety.** Each branch of the military has its own policies and regulations that act to protect its workers, despite their work location. AFI 91-202, *The U.S. Air Force Mishap Prevention Program*, “establishes mishap prevention program requirements, assigns responsibilities for program elements, and contains program management information”. In order to meet the goals of minimizing loss of USAF resources and protecting military personnel, mishap prevention programs should address: groups at increased risk for mishaps, injury of illness; a process for tracking incidents; funding for safety programs; metrics for measuring performance; safety goals; and methods to identify safety BMPs.

**GRABS Site Safety.** As described in **Section 3.9.2**, a chance for encountering buried ordnance still exists on the GRABS Site. All personnel using the Site are given a UXO safety brief prior to going onsite; the Kirtland AFB EOD team is notified and removes or detonates in-place any identified UXO. Artillery rounds (105 mm) have been found on and removed from the GRABS Site as recently as 2012.

As identified in **Section 1.1.5.8**, DTRA implements extensive health and safety measures during each onsite test event to ensure a safe environment for personnel and the public. These include:

- **Explosives Safety.** Explosive materials use and handling at the GRABS Site are performed in accordance with DOD and OSHA Standards (29 CFR §1910.109) and are monitored by a DTRA Certified Explosives Safety Officer. Following arrival of explosives at the GRABS Site, security is maintained 24 hours per day until the explosives are detonated. No explosives are stored permanently at the Site; explosives are brought to the Site in advance of each test event, and only in the quantities necessary to support the test.
- **Site-Specific HASPs and Analyses.** DTRA follows and implements existing HASPs, including the GRABS ESP and the site-specific HASRA, for all activities conducted at the GRABS Site. Both plans are presented in their entirety in **Appendix B** and summarized in **Section 1.1.5.8**.

Through implementation of the above plans and procedures, including detailed test-specific safety plans and procedures, no injuries or accidents have occurred at the GRABS Site.

**Public Safety.** Kirtland AFB has its own emergency services department. The emergency services department provides Kirtland AFB with fire suppression, crash response, rescue, emergency medical response, hazardous substance protection, and emergency response planning and community health and safety education through the dissemination of public safety information to the installation. A Veterans Affairs hospital and the 377th Medical Groups' Outpatient Clinic are the primary military medical facilities at Kirtland AFB (Kirtland AFB undated). A number of other hospitals and clinics, which are devoted to the public, are located off-installation in the city of Albuquerque. These facilities include the Heart Hospital of New Mexico, University of New Mexico Hospital, and Presbyterian Kaseman Hospital (Google Maps 2013).

The Fire and Rescue Emergency Services Division for the city of Albuquerque provides fire suppression, crash response, rescue, emergency medical response, and hazardous substance response to the nearby city of Albuquerque. The Fire and Rescue Emergency Services Division includes 23 fire engine companies, 7 fire ladder companies, 3 hazardous material response units,

and 18 medical response ambulances (City of Albuquerque 2013). The city of Albuquerque also has approximately 992 police officers available to provide law enforcement services (Albuquerque Police Department 2012). The Southeast Area Command (Phil Chacon Memorial Substation) borders the northwest corner of Kirtland AFB. A mutual service agreement is in place between the city of Albuquerque and Kirtland AFB.

**Radiological Safety.** Radiological materials are not used at the GRABS Site. As described in **Section 3.9.2**, the GRABS Site has been cleared of depleted uranium from historic, pre-DTRA uses, prior to the establishment of the GRABS.

## 3.11 Socioeconomics and Environmental Justice

### 3.11.1 Definition of the Resource

**Socioeconomics.** Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several inter-related and non-related attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

**Environmental Justice.** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and disproportionate impacts that could be imposed on them. This EO requires that federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

**Children's Environmental Health and Safety Risks.** EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks".

### 3.11.2 Existing Conditions

**Socioeconomics.** The Albuquerque Metropolitan Statistical Area (MSA) is considered the region of influence for socioeconomic effects of the Proposed Action. The population of the Albuquerque MSA, defined by the U.S. Census Bureau as Bernalillo, Sandoval, and Valencia counties, was 887,077 people in the 2010 U.S. Census. This represents a 24.5 percent increase, from the 2000 U.S. Census for the Albuquerque MSA population (U.S. Census Bureau 2010).

The state of New Mexico's population totaled 2,059,179 in 2010. The population of Bernalillo County was 662,564 in 2010, representing 32 percent of the total population for the state of New Mexico. Based on 2000 and 2010 U.S. Census data, the population of Bernalillo County grew

19 percent from 2000 to 2010, while during this same time period Sandoval County experienced a 46.3 percent increase in population and Valencia County grew by 15.7 percent. The growth rate in the Albuquerque MSA from 2000 to 2010 (24.5 percent) was much greater than the growth rate of the state of New Mexico (13.2 percent) and of the United States (9.7 percent) over the same time period. Please see **Table 10** for 2000 and 2010 population data (U.S. Census Bureau 2010).

**Table 10. Population in the Region of Influence as Compared to New Mexico and the United States (2000 and 2010)**

Location	2000	2010	Percent Change
<b>United States</b>	281,421,906	308,745,538	9.7%
<b>New Mexico</b>	1,819,046	2,059,179	13.2%
<b>Albuquerque MSA</b>	712,738	887,077	24.5%
<b>Bernalillo County</b>	556,678	662,564	19.0%
<b>Sandoval County</b>	89,908	131,561	46.3%
<b>Valencia County</b>	66,152	76,569	15.7%

Source: U.S. Census Bureau 2010

The three largest industries in the Albuquerque MSA in terms of percentage of the workforce employed within the industry are: the educational, health, and social services industry (22 percent); the professional, scientific, management, administrative, and waste management services industry (13 percent); and the retail trade industry (11 percent). The construction industry represents 9 percent of the workforce (U.S. Census Bureau 2009). In April 2013, the Bureau of Labor Statistics reported a 6.4 percent unemployment rate in Albuquerque and a 6.2 percent unemployment rate in Bernalillo County; in April 2013, the United States had a higher unemployment rate of 7.1 percent (U.S. Department of Labor, Bureau of Labor Statistics 2013).

During FY 2012, 20,083 individuals were employed by Kirtland AFB, making the installation responsible for 1 of every 14 jobs in the state of New Mexico. In 2012, there were 3,257 active-duty personnel on the installation. Direct payroll expenditures from Kirtland AFB totaled over \$2.1 billion in 2012. When non-payroll expenditures associated with Kirtland AFB are included, total expenditures in 2012 from Kirtland AFB exceeded \$7.8 billion, with DOD expenditures representing approximately \$4.8 billion of that total (Kirtland AFB 2013d).

Currently, there are no full-time personnel assigned to the GRABS Site. All personnel at the GRABS Site are present during the preparations for, and execution of, test and training events.

**Environmental Justice.** To provide a baseline measurement for environmental justice, an area around the installation must be established to examine the impacts on minority and low-income populations. For the purposes of this analysis, a 50-mile radius around Kirtland AFB was evaluated as the region of influence to identify minority and low-income populations. This 50-mile radius includes numerous towns, villages, census-designated places, and cities. The largest of these is the city of Albuquerque with a population of 545,852. In the city of Albuquerque, 46.7 percent of the population is Hispanic and 4.6 percent is Native American (**Table 11**) (U.S. Census Bureau 2010).

The city of Rio Rancho, to the northwest of Albuquerque, has a population of 87,521 and is the second largest city within 50 miles of Kirtland AFB. The Hispanic population represents 36.7 percent of the total population in Rio Rancho, and the Native American population presents 3.2 percent of the total population. The third largest population center within 50 miles of

Kirtland AFB is South Valley, situated to the west of Kirtland AFB, containing 40,976 persons. In South Valley, the Hispanic population is 80.2 percent of the total population, and the Native American population is 2.2 percent of the total population.

**Table 11. Population Characteristics of the Region of Influence (2010)**

Race and Origin	City of Albuquerque	City of Rio Rancho	South Valley	New Mexico	United States
<b>Total Population</b>	545,852	87,521	40,976	2,059,179	308,745,538
<b>Percent Under 5 Years of Age</b>	7.0	7.2	7.3	7.0	6.5
<b>Percent Over 65 Years of Age</b>	12.1	10.8	12.3	13.2	13.0
<b>Percent White</b>	69.7	76.0	59.5	68.4	72.4
<b>Percent Black or African American</b>	3.3	2.9	1.2	2.1	12.6
<b>Percent American Indian and Alaska Native</b>	4.6	3.2	2.2	9.4	0.9
<b>Percent Asian</b>	2.6	1.9	0.4	1.4	4.8
<b>Percent Native Hawaiian and Other Pacific Islander</b>	0.1	0.2	0.0	0.1	0.2
<b>Percent Other Race</b>	15.0	11.1	32.7	15.0	6.2
<b>Percent Two or More Races</b>	4.6	4.7	4.0	3.7	2.9
<b>Percent Hispanic or Latino</b>	46.7	36.7	80.2	46.3	16.3
<b>Estimated Median Household Income</b>	\$45,478	\$59,182	\$35,854	\$42,742	\$51,425
<b>Estimated Percent of Families Living Below Poverty</b>	11.2	5.4	19.4	13.7	9.9

Source: U.S. Census Bureau 2010

Note: Hispanic and Latino denote a place of origin.

The average median household income for the Albuquerque MSA is estimated at \$47,042, which is slightly less than the United States estimated average of \$51,425 (U.S. Census Bureau 2009).

The percentage of families living below the poverty level varies greatly throughout the metropolitan area of Albuquerque, with the city of Albuquerque having poverty levels similar to the state of New Mexico and the United States (see **Table 11**). South Valley has a higher poverty rate compared to the state of New Mexico and the United States, and Rio Rancho has a lower poverty rate than the state of New Mexico and the United States (U.S. Census Bureau 2009, U.S. Census Bureau 2010).

As the GRABS Site is located within a remote portion of Kirtland AFB, there are no proximate public population centers, including no concentrations of minority or low-income residents.

**Children's Environmental Health and Safety Risks.** The percentage of individuals under the age of 5 is very similar in the city of Albuquerque, the city of Rio Rancho, and South Valley when compared to the state of New Mexico and the United States (U.S. Census Bureau 2010) (see **Table 11**). Children are not present or permitted on the GRABS Site, and are supervised by adults when on Kirtland AFB.

## 4. ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental consequences on the affected environment of implementing the Proposed Action and the No Action Alternative. In **Sections 4.1** through **4.11**, each alternative is evaluated for its potential to affect physical, biological, cultural, and socioeconomic resources in accordance with 40 CFR §1508.8. Potential impacts on each resource area are described in terms of their significance. The magnitude of impacts on each resource shall be described as significant, less than significant, or no impact. Significant impacts are those impacts that would result in substantial changes to the environment (as defined by 40 CFR §1508.27) and should receive the greatest attention in the decision-making process.

**Table 12. Best Management Practices Incorporated into the Proposed Action**

Technical Resource Area	Best Management Practice/Environmental Protection Measure
<b>Noise</b>	To the extent possible, heavy truck traffic shall occur Monday through Friday between 8:00 am and 6:00 pm, reducing noise impacts during sensitive nighttime hours.
	Select material transportation routes as far away from sensitive receptors as possible.
	Ensure onsite personnel wear proper hearing protection.
	Notify adjacent areas that could be subject to “startle” impacts from explosive test events.
<b>Visual Resources</b>	Minimize viewshed impacts by improved housekeeping and restoring the Site to pre-test conditions as quickly as possible.
	Use directional lighting to minimize impacts on adjacent areas and activities.
<b>Air Quality</b>	Use appropriate dust suppression methods during onsite activities. Suggested methods include application of water, dust palliative, or soil stabilizers; use of enclosures, covers, silt fences, or wheel washers; and suspension of earth-moving activities during high wind conditions. Visually monitor all activities regularly, particularly during extended periods of dry weather, and implement dust control measures when appropriate.
	Maintain an appropriate speed to minimize dust generated by vehicles and equipment on unpaved surfaces. Cover haul trucks with tarps.
	Stabilize previously disturbed areas through mulching if the area would be inactive for several weeks or more.
	Shut down machinery and equipment when not in use for extended periods to reduce vehicle emissions.
	Comply with the requirements of the current site-specific Fugitive Dust Control Programmatic Permit #P12-0007.
	Comply with the requirements of Open Burn Permit #14-0001.
	Test events using Btk would only occur when winds are from the south, ensuring the biological simulant would not migrate off installation.
<b>Geology and Soils</b>	<i>If an NPDES permit is required:</i> Prior to any ground-disturbing activities that would exceed 1 acre, obtain and comply with an appropriate NDPEs permit, including submission and approval of a NOI and a SWPPP. Manage storm water runoff and erosion through the use of earth berms; sedimentation/storm water detention basins; filter strips; and spill prevention and management techniques, as detailed in the approved SWPPP.
	Use existing topography and minimize ground-disturbing activities to the maximum extent possible. Limit the areas of soil disturbance to the minimum area required to accomplish objectives. Restore temporarily disturbed areas to pre-project conditions upon completion of the activity.
	Revegetate the Site as necessary in order to maintain the 5 acre limit outlined in the Fugitive Dust Control Programmatic Permit #P12-0007.

**Table 12. Best Management Practices Incorporated into the Proposed Action (continued)**

Technical Resource Area	Best Management Practice/Environmental Protection Measure
Water Resources	<p><i>If an NPDES permit is required:</i> Prior to any ground-disturbing activities that would exceed 1 acre, obtain and comply with an appropriate NDPEs permit, including submission and approval of a NOI and a SWPPP. Manage storm water runoff and erosion through the use of earth berms; sedimentation/storm water detention basins; filter strips; and spill prevention and management techniques, as detailed in the approved SWPPP.</p>
	<p>Select, install, and maintain effective erosion- and sedimentation-control measures as identified and as necessary to comply with the 2012 CGP, such as sediment basins, sediment traps, silt fences, and vegetative buffer strips; offsite sediment tracking and dust control; runoff management; post-construction storm water management; and erosion control and stabilization.</p>
	<p>Comply with Section 438 of the EISA. Ensure that any federal structure with a proposed disturbance area exceeding 5,000 square feet maintain or restore the pre-development hydrology of the property to the maximum extent technically feasible, with regard to temperature, rate, volume, and duration of flow. Comply with DOD's policy regarding implementation of Storm Water Requirements under Section 438 of the EISA and the USEPA's Technical Guidance on Implementing the Storm Water Runoff Requirements for Federal Projects under Section 438 of the EISA.</p>
	<p>Ensure proper housekeeping, maintenance of equipment, and containment of fuels and other potentially hazardous materials to minimize the potential for a release of fluids to include secondary containment and keeping spill kits onsite during project activities.</p>
	<p>Design any structure to meet UFC LID requirements to maintain or restore the natural hydrologic functions of the Site.</p>
	<p>Ensure portable latrines are securely anchored to the ground to prevent toppling.</p>
Biological Resources	<p>Time construction to occur between 1 September and 28 February in order to avoid nesting periods of migratory birds protected under the MBTA. Any construction proposed outside this timeframe, would require a qualified biologist to survey the area to ensure no active nests are disturbed.</p>
	<p>Reduce the amount of nesting areas available to wildlife through improved housekeeping and restoring the Site to pre-test conditions as quickly as possible.</p>
	<p>Use installation-approved seed mix when revegetating to avoid the potential introduction of non-native or invasive species.</p>
	<p>Comply with all requirements and management measures identified in the Kirtland AFB Integrated Natural Resources Management Plan (INRMP).</p>
Cultural Resources	<p>Comply with Kirtland AFB's Integrated Cultural Resources Management Plan (ICRMP).</p>
	<p>Should human remains or other cultural items be discovered during project activities, work shall cease until DTRA, the USAF, a qualified archaeologist, and the SHPO are contacted to properly identify and appropriately handle discovered items in accordance with applicable state and federal laws and the Kirtland AFB ICRMP.</p>
Infrastructure	<p>Ensure activities do not adversely affect traffic flow on local roadways. Time activities and traffic to avoid peak travel hours. Ensure debris and/or soil is not deposited on public roadways during any proposed activities.</p>
	<p>Reduce amount of construction waste going to the landfill by diverting materials that could be recycled or reused to the greatest extent possible.</p>
	<p>Ensure portable latrines are securely anchored to the ground and are serviced on a routine basis.</p>

**Table 12. Best Management Practices Incorporated into the Proposed Action (continued)**

<b>Technical Resource Area</b>	<b>Best Management Practice/Environmental Protection Measure</b>
<b>Hazardous Materials and Waste</b>	Ensure vehicles are properly serviced and are not leaking. Implement secondary containment measures to ensure that contamination from a spill would not occur. In the event of a spill, comply with Kirtland AFB's Hazardous Material Emergency Planning and Response Plan.
	Ensure all construction and test event debris is collected and disposed of quickly and appropriately, in accordance with applicable laws and regulations.
	Comply with existing Kirtland AFB SOPs and applicable federal and state laws governing the use, generation, storage, or transportation of solid or hazardous materials.
<b>Safety</b>	Require non-essential personnel to vacate construction and test areas. During construction and test activities, access to the Site would be limited and controlled.
	Ensure all personnel utilizing the Site receive a UXO safety brief prior to going onsite.
	Continue implementation of HASPs, SOPs, HASRAs, and ESPs and ensure personnel are using appropriate PPE, such as hearing protection.

## 4.1 Noise

### 4.1.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise impacts were evaluated qualitatively for the alternatives considered.

### 4.1.2 Proposed Action

Noise impacts potentially resulting from detonations are more accurately assessed by measuring the sound pressure produced, not the number of dB. Per the 1993 EA and as shown in **Table 5**, a surface detonation of 1,000 pounds of explosives would result in a pressure level of approximately 2.4 kPa (0.35 psi) at a distance of 970 feet; this sound pressure level can cause tinnitus (ringing of the ears) with a temporary impairment of human hearing. This distance is well within the control of the onsite safety officers and test controllers, and no personnel should be in the open within this range during any explosive test events (Defense Nuclear Agency 1993).

Anyone within the range of a 0.10 kPa (0.015 psi) sound pressure level may be subject to "startle" impacts of the airblast. The AFRL Starfire Optical Range facilities could be located within the startle range for the larger detonation events. However, DTRA would notify individuals within this range in an effort to reduce or avoid any potential impacts (Defense Nuclear Agency 1993).

Noise or airblast impacts are not expected to damage or injure biological resources beyond approximately 270 feet from a 1000-pound surface detonation (i.e., below a peak overpressure level of 13.8 kPa or 2.0 psi). Prior to any test event detonation, personnel would sweep the area to ensure that no large mammals are present within 500 feet of the test structure. Injuries and deaths could potentially occur to small rodents and lizards; however, past studies have shown that construction and human activities usually result in greatly decreased populations in the

immediate vicinity of the test structure. As such, mobile animal species are not likely to be present within the immediate area during construction activities or when personnel are in the vicinity of the GRABS Site (Defense Nuclear Agency 1993).

The threshold for major structural damage caused by sound pressure is approximately 6.9 kPa (1.0 psi), or at a maximum range of approximately 450 feet from the ongoing test events at the GRABS Site (see **Table 5**). The closest inhabited structures are located 4,245 feet outside the structural damage threshold radii for the examples presented in **Table 5**, assuming that the test events are detonated under relatively normal, calm atmospheric conditions or under reducing gradient meteorological conditions (Defense Nuclear Agency 1993).

Pressure waves that travel through the ground surface, called ground shock, may also damage existing resources. Studies specifically designed to determine the impacts of ground shock on subsurface animals, plant roots, and soil microbes show no damage by shock with wave peak-to-peak velocities less than 9 inches per second (in/sec). This level occurs 115 feet from the maximum yield test event. Subjective human response to vibratory ground motion, based on earthquake studies, has shown motions of 0.04 in/sec to be the absolute lowest perceptible threshold, and motions greater than 0.8 in/sec to be “unpleasant”. These motions occur at 4,240 feet and 575 feet, respectively, from the proposed maximum yield test event. No humans would be located within the range of “unpleasant” ground motions for any of the detonations occurring at the GRABS Site (Defense Nuclear Agency 1993).

The threshold level for any type of structural damage to residential type buildings is a peak-to-peak velocity of 3.5 in/sec, which occurs approximately 215 feet from the proposed maximum-yield test event. Non-residential structures can withstand higher motion levels since the threshold is based on “aesthetic” damage (Defense Nuclear Agency 1993).

As analyzed below, implementation of the Proposed Action would not result in significant noise impacts based on the above criteria.

The Proposed Action would not introduce any new testing or training activities to the GRABS Site that would change the existing noise environment over current levels. Current and historic testing activities at the GRABS Site have resulted in no noise complaints. The proposed use of a biological simulant would introduce a new form of testing and training at the GRABS Site, but the noise created by each test event, conducted once every 2 years, would be similar to that created by ongoing explosive test events; no additional noise impacts would be expected. As identified in **Appendix B** and described in **Sections 1.1.5.8** and **3.1.2**, DTRA would continue to implement an aggressive and effective pre- and during-test process to ensure offsite noise and vibration impacts are minimized; the existing NEW limit of 900 pounds would remain in effect. As such, no long-term, adverse impacts on noise would be anticipated.

As discussed in **Section 2.2.3**, operation of the GRABS Site would include the periodic construction and de-construction of temporary, small-scale (i.e., less than 5 acres, and typically less than 1 acre) test areas and associated structures. Noise from construction activities varies depending on the type of equipment being used, the area in which the action occurs, and the distance from the noise source. To predict how construction activities would impact adjacent populations, noise from the probable construction activities was estimated. For example, as shown in **Table 4**, construction usually involves several pieces of equipment (e.g., backhoe and dump truck) that can be used simultaneously. Under the Proposed Action, the cumulative noise from the construction equipment, during the busiest day, was estimated to determine the total impact of noise from construction activities at a given distance. Examples of expected construction noise during daytime hours at specified distances are shown in **Table 13**. These sound levels were predicted at 100, 200, 400, 800, and 1,200 feet from the source of the noise.

Even under the “worst case scenario” noise levels described in **Table 13**, people within 100 to 200 feet of the noise source would only find the noise “annoying” or “very annoying” (see **Table 3**). The most proximate offsite structure to the GRABS Site boundary exists approximately 1,849 feet to the east, on Kirtland AFB (see **Figure 2**).

**Table 13. Predicted Noise Levels from Construction Activities**

Distance from Noise Source (feet)	Predicted Noise Level (dBA)
100	86
200	80
400	74
800	68
1,200	64

As such, while construction activities would result in short-term increases to the existing noise environment, these impacts would be negligible, temporary in nature, and generally not audible to any off-installation area. In addition, any potential noise impacts would be further reduced or avoided with implementation of the noise BMPs identified in **Table 12**. As such, no significant adverse impacts on noise are identified.

#### **4.1.3 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented and operations at the GRABS Site would continue as under current conditions, complying with the NEW limit of 900 pounds. As noted above, current and historic testing activities at the GRABS Site have not resulted in any noise complaints. Therefore, no adverse impacts on noise would occur.

### **4.2 Visual Resources**

#### **4.2.1 Evaluation Criteria**

The potential for significant impacts on visual resources has been assessed based on whether the Proposed Action would:

- Adversely influence a national, state, or local park or recreation area
- Degrade or diminish a federal, state, or local scenic resource
- Create adverse intrusions or visual conflicts affecting the quality of a landscape

#### **4.2.2 Proposed Action**

The 1993 EA determined that the activities currently ongoing at the GRABS Site could result in “minor degradation of the aesthetic quality of a limited portion of the test site caused by surface disturbance during construction”. These potential impacts include construction crews and ground-disturbing activities associated with construction and de-construction of test structures; a dust cloud created during detonations; or a visible explosion or thermal blast (“fireball”) during certain explosive tests. Each of these potential impacts would be temporary in nature and consistent with the existing military land use of Kirtland AFB. As such, the 1993 EA determined that the action analyzed within that document (i.e., the currently ongoing activities conducted at the GRABS Site today) would have no impact on aesthetics or visual resources (see Table 2.1 and Section 2.8 of Defense Nuclear Agency 1993).

As discussed above and analyzed below, implementation of the Proposed Action would not result in significant adverse impacts on visual resources based on the criteria listed in **Section 4.2.1**.

During construction and de-construction of the proposed temporary test structures at the GRABS Site, equipment, including bulldozers, backhoes, front-end loaders, dump trucks, and tractor-trailers would be visible from areas adjoining the Site. Directional lighting would be used to minimize lighting impacts on offsite areas and activities. Construction wastes temporarily stored for disposal would be visible in piles and in onsite dumpsters. Construction materials and wastes would be seen in trucks on installation and public roadways being transported to and from the Site. Construction activities at the GRABS Site could adversely affect the local aesthetic appeal, but any potential impacts would be short-term in nature and consistent with Kirtland AFB's installation construction practices.

Due to the existing disturbed nature of the GRABS Site, the infrequent need of temporary test sites and structures, and the small amount of ground disturbance proposed (i.e., up to 5 acres for any one testing event), only short-term, negligible, adverse impacts on visual resources would be anticipated during construction and de-construction activities associated with operation of the GRABS Site.

The Proposed Action would not significantly alter the visual appearance of the Site. Proposed structures and activities would be consistent with ongoing operations of the GRABS Site. Potential adverse impacts would be further reduced or avoided with implementation of the BMPs identified in **Table 12**.

Ongoing operations would include the periodic use of balloons to hang sensors to collect test data after a test event at the GRABS Site (see **Section 1.1.5.8**). Periodic use of these balloons as part of testing events would continue to result in short-term, negligible, adverse impacts on visual resources.

As described in **Section 2.2.2**, the Proposed Action includes improved "housekeeping" activities at the GRABS Site. Establishing test structure clean-up dates for each test event would restore the area to current pre-test conditions and avoid the current situation of debris being left at the GRABS Site for extended periods of time. Implementing this component of the Proposed Action would result in a long-term, beneficial impact on visual resource and improve the general aesthetics of the GRABS Site.

#### **4.2.3 No Action Alternative**

The No Action Alternative would result in the continuation of existing visual and aesthetic conditions, as described in **Section 3.2.2**. No change to the installation's current aesthetic appearance would occur with implementation of the No Action Alternative. The potential long-term, beneficial impact of implementing the improved "housekeeping" practices included in the Proposed Action would not occur under the No Action Alternative.

### **4.3 Air Quality**

#### **4.3.1 Evaluation Criteria**

The impacts on local and regional air quality conditions near a proposed federal action are determined based upon the anticipated increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS or SAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any NAAQS or SAAQS
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP or permit limitation

Impacts on air quality in NAAQS or SAAQS “non-attainment” or “maintenance” areas are considered significant if the net changes in project-related pollutant emissions would result in any of the following scenarios:

- Exceed the General Conformity *de minimis* threshold emissions rates established by USEPA
- Cause or contribute to a violation of any NAAQS or SAAQS
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP or permit limitations

USEPA established federal *de minimis* threshold emissions rates in the General Conformity Rule to focus analytical requirements on those federal actions with the potential to substantially affect air quality. **Table 14** presents those thresholds, by regulated pollutant. As shown in **Table 14**, *de minimis* thresholds vary depending on the severity of the non-attainment area classification.

**Table 14. Conformity *de minimis* Emissions Thresholds**

Pollutant	Status	Classification	<i>de minimis</i> Limit (tpy)
$O_3$ (measured as $NO_x$ or VOCs)	Non-attainment	Extreme	10
		Severe	25
	Maintenance	Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 ( $NO_x$ )
		All others	100
		Inside ozone transport region	50 (VOCs)/100 ( $NO_x$ )
$CO$	Non-attainment/maintenance	Outside ozone transport region	100
		All	100
$PM_{10}$	Non-attainment/maintenance	Serious	70
		Moderate	100
$PM_{2.5}$ (measured directly, as $SO_2$ , or as $NO_x$ )	Non-attainment/maintenance	Not Applicable	100
		All	100
$SO_2$	Non-attainment/maintenance	All	100
$NO_x$	Non-attainment/maintenance	All	100

Source: 40 CFR §93.153

With respect to the General Conformity Rule, impacts on air quality would be considered significant if the proposed federal action would result in an increase of a non-attainment or maintenance area's emissions inventory above the *de minimis* threshold levels established in 40 CFR §93.153(b) for individual non-attainment pollutants or for pollutants for which the area has been re-designated as a maintenance area.

In addition to the *de minimis* emissions thresholds, federal PSD regulations define air pollutant emissions to be significant if: (1) a proposed project is a modification with a net emissions increase to an existing PSD major source; (2) the source is within 10 kilometers of any Class I area; and (3) stationary source emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1  $\mu\text{g}/\text{m}^3$  or more (40 CFR §52.21[b][23][iii]). PSD regulations do not apply to the Proposed Action at the GRABS Site because Kirtland AFB is not an existing PSD major source and only negligible, if any, increases in stationary source emissions would be associated with the Proposed Action. In addition, as stated in **Section 3.3.2**, no Class I areas are located within 10 kilometers of Kirtland AFB.

Per the New Mexico Air Quality Control Act and 20.11.41 NMAC, any person planning to construct a new stationary source or modify an existing stationary source of air contaminants in Bernalillo County, including the city of Albuquerque, where the stationary source emits one or more regulated air contaminants that exceed a rate of 10 pounds per hour or 25 tpy would be required to obtain a permit to construct from the AEHD-AQD. A permit from the AEHD-AQD would also be required if an emissions source was subject to federal NSPSs or National Emissions Standards for HAPs.

Per 20.11.21 NMAC, an Open Burn Permit is required for above- or below-ground detonations of more than 20 pounds of explosives. All activities conducted at the GRABS Site would comply with the conditions set forth in Open Burn Permit #14-0001, issued 17 December 2013. This permit conditionally approves Kirtland AFB to conduct tests using up to 2,000 pounds of explosives for the time period beginning 1 January 2014 and ending 31 December 2014 (see **Appendix C**).

#### 4.3.2 Proposed Action

The implementation of the Proposed Action would result in short-term, adverse impacts on air quality resources; however, these impacts are expected to be less than significant. Emissions resulting from the Proposed Action are discussed below.

**Emission Estimates.** Implementation of the Proposed Action would result in short-term, adverse impacts on air quality resources during construction; however, these impacts are expected to be less than significant.

The Proposed Action would generate air pollutant emissions from periodic, small-scale construction and de-construction/restoration activities conducted over the life of the GRABS Site. These emissions would only be produced for the duration of the activities. Construction of temporary test sites and structures at the GRABS Site would generate air pollutant emissions because of ground-disturbing activities such as grading, filling, compacting, and trenching; operation of construction equipment; and operation of trucks hauling materials and waste to and from the work site. Construction activities would also generate particulate emissions as fugitive dust from ground-disturbing activities and from the combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions.

Per the New Mexico Air Quality Control Act and 20.11.20 NMAC, *Fugitive Dust Control*, a fugitive dust control construction permit is required for projects disturbing 0.75 acre or more, as well as the demolition of buildings containing more than 75,000 cubic feet of space. As stated in 20.11.20.12 NMAC, *General Provisions*, each person shall use reasonably available control measures or any other effective control measure during active operations or on inactive disturbed surface areas, as necessary to prevent the release of fugitive dust, whether or not the person is required by 20.11.20 NMAC to obtain a fugitive dust control permit.

The GRABS Site currently operates under a 20.11.20 NMAC Fugitive Dust Control Programmatic Permit #P12-0007 issued by the AEHD-AQD in 2011 (AEHD-AQD 2011) (see **Appendix C**). This permit, which covers routine maintenance or routine ongoing active operations on existing land or test structures within the 155-acre GRABS Site, is valid for 5 years and allows up to 5 acres of soil disturbance at the GRABS Site at any given time. DTRA's ongoing compliance with this permit and its associated requirements, as well as implementation of the air quality BMPs identified in **Table 12**, would ensure that fugitive dust impacts, as well as other adverse air quality impacts, continue to be minimized at the GRABS Site during test site preparation and restoration activities. As such, no long-term, adverse impacts on air quality are anticipated.

During each testing event, depending upon the explosives used (see **Section 1.1.5.8**), minor quantities of air emissions are and would be generated. However, these emissions are (and would continue to be) short-term; occur in a remote, unpopulated area; and rapidly disperse into the ambient air. With implementation of the Proposed Action, the explosive test events would continue to occur at an annual rate of 20 events, with each test event lasting, on average, 4 days (see **Section 1.1.5**). As testing event levels and explosives use would not increase or change under the Proposed Action, no long-term, adverse impacts on air quality are anticipated.

Introduction of Btk-related testing (see **Section 2.2.1**) at the GRABS Site at a proposed frequency of once every 2 years and at levels equivalent to agricultural use would not result in any long-term, adverse impacts on air quality. This testing would only occur when winds are from the south, ensuring lands off-installation would be unaffected.

**General Conformity.** Although a formal conformity analysis is not required for the Proposed Action, 32 CFR Part 989, *Environmental Impact Analysis Process*, and AFI 32-7040, *Air Quality Compliance*, requires sufficient documentation of air quality impacts. Criteria pollutant emissions from construction activities associated with the construction and de-construction of test structures are estimated in **Appendix G** and summarized in **Table 15**. Emissions were estimated using the formulas and default estimates contained within a prior Air Force Air Conformity Applicability Model Detail Report prepared in 2013 for a different project within the Kirtland AFB. The assumptions and methodology are presented in **Appendix G**. **Table 15** presents a “worst case scenario” in which each of the approximately 20 annual test events requires a 360-square foot test structure measuring 6 feet high. Actual air emissions associated with the Proposed Action and ongoing operation of the GRABS Site are expected to be less than this “worst case scenario”, as not every test event requires a new structure.

**Table 15. Estimated Emissions Resulting from Each Test Event at the GRABS Site\***

Emissions	VOC (tpy)	SO <sub>x</sub> (tpy)	NO <sub>x</sub> (tpy)	CO (tpy)	PM <sub>10</sub> (tpy)	PM <sub>2.5</sub> (tpy)	CO <sub>2</sub> (tpy)
Commuters	2.89 X 10 <sup>-2</sup>	3.55 X 10 <sup>-4</sup>	2.43 X 10 <sup>-2</sup>	0.44	1.13 X 10 <sup>-3</sup>	5.51 X 10 <sup>-4</sup>	19.70
De-construction	1.47 X 10 <sup>-2</sup>	1.46 X 10 <sup>-4</sup>	9.09 X 10 <sup>-2</sup>	9.23 X 10 <sup>-2</sup>	6.64 X 10 <sup>-3</sup>	6.15 X 10 <sup>-3</sup>	13.15
Construction	1.48 X 10 <sup>-2</sup>	1.48 X 10 <sup>-4</sup>	9.14 X 10 <sup>-2</sup>	9.27 X 10 <sup>-2</sup>	6.20 X 10 <sup>-3</sup>	6.16 X 10 <sup>-3</sup>	13.37
Vendor	1.17 X 10 <sup>-5</sup>	2.10 X 10 <sup>-7</sup>	5.19 X 10 <sup>-5</sup>	3.70 X 10 <sup>-5</sup>	1.99 X 10 <sup>-6</sup>	1.50 X 10 <sup>-6</sup>	2.25 X 10 <sup>-2</sup>
Site Grading	9.81 X 10 <sup>-3</sup>	9.75 X 10 <sup>-5</sup>	6.06 X 10 <sup>-2</sup>	6.15 X 10 <sup>-2</sup>	4.20 X 10 <sup>-3</sup>	4.10 X 10 <sup>-3</sup>	8.75
<b>Total Emissions per Test Event</b>	<b>6.83 X 10<sup>-2</sup></b>	<b>7.48 X 10<sup>-4</sup></b>	<b>0.27</b>	<b>0.69</b>	<b>1.82 X 10<sup>-2</sup></b>	<b>1.69 X 10<sup>-2</sup></b>	<b>54.99</b>
<b>Total Annual (20 test events)</b>	<b>1.36</b>	<b>1.49 X 10<sup>-2</sup></b>	<b>5.34</b>	<b>13.79</b>	<b>0.36</b>	<b>0.34</b>	<b>1099.77</b>

Acronym: tpy = tons per year

Note: \* = see **Appendix G** for formulas and detailed calculations

All emissions from the Proposed Action and ongoing activities at the GRABS Site were estimated and compared to the *de minimis* thresholds presented in **Table 14**. The total of all produced criteria pollutants fall well below the 100 tpy *de minimis* threshold and is considered a less-than-significant impact.

**Operational Detonation Emissions of Explosives.** **Table 9** presents the amount of criteria pollutants and HAPs produced during each explosive test event and the estimated annual amount if the maximum NEW limit of 900 pounds is used. The total amount of these emissions is 8.4 tpy and does not exceed *de minimis* thresholds presented in **Table 14**.

**Greenhouse Gas Emissions.** Test site construction and de-construction/restoration activities associated with the Proposed Action would contribute directly to emissions of GHGs from the combustion of fossil fuels. Because CO<sub>2</sub> emissions account for approximately 92 percent of all GHG emissions in the United States, they are used for analyses of GHG emissions in this assessment. Implementation of the GHG goals outlined in the DOD SSPP would assist Kirtland AFB in complying with EO 13514 (see **Section 3.4.1**).

The U.S. DOE, Energy Information Administration estimates that in 2008 gross CO<sub>2</sub> emissions in the state of New Mexico were 57.6 million metric tons and in 2008 gross CO<sub>2</sub> emissions in the entire United States were 5,814.4 million metric tons (U.S. DOE Energy Information Administration 2010). As shown in **Table 15** and **Appendix G**, test structure preparation at the GRABS Site emits approximately 1099.77 tpy of CO<sub>2</sub> under current conditions. Total CO<sub>2</sub> emissions from test structure construction and de-construction represents 1.73X10<sup>-5</sup> percent of the state of New Mexico's 2008 CO<sub>2</sub> emissions and 1.71X10<sup>-7</sup> percent of the entire United States' 2008 CO<sub>2</sub> emissions. Therefore, ongoing activities at the GRABS Site represent a negligible contribution toward statewide and national GHG inventories.

#### 4.3.3 No Action Alternative

The No Action Alternative would result in the continuation of existing air emissions from the GRABS Site, as described in **Section 3.4.2**. Ongoing explosive test events would continue to occur at their current rate and in compliance with Fugitive Dust Control Programmatic Permit #P12-0007 and Open Burn Permit #14-0001; these events do not produce significant air quality impacts. No change to the local or regional air quality environment would be expected with implementation of the No Action Alternative.

### 4.4 Geology and Soils

#### 4.4.1 Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of a proposed action on geological resources. Generally, adverse impacts can be avoided or minimized if proper construction techniques, erosion control and storm water management measures, and structural engineering designs are incorporated into project development.

Impacts on geology and soils would be significant if they would:

- Alter the lithology, stratigraphy, and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability
- Substantially change the soil composition, structure, or function within the environment.

#### 4.4.2 Proposed Action

Per the conclusions presented in the 1993 EA, the major geologic consequence would be an increase in erosion potential caused by the surface disturbance during construction of test structures. This arises from the nature of the soils exposed and from the difficulty in revegetating these areas in arid environments. Because of the relatively small surface area involved and the use of available engineering methods to control erosion from surface disturbance, it is expected that increases in erosion potential would not be significant. Extensive literature searches and contacts with personnel from the Bureau of Mines, Waterways Experiment Station, USGS, and other DOD organizations involved in HE detonations indicate that significant contamination of soil by detonation products has never been observed (see Sections 2.2.5 and 2.6 of Defense Nuclear Agency 1993).

Based on the above findings of the 1993 EA and as analyzed below, implementation of the Proposed Action would not result in significant, adverse impacts on geology and soils based on the evaluation criteria presented in **Section 4.4.1**.

As the proposed introduction of a biological simulant during explosive test events would not require any ground disturbance, no adverse impacts on geology and soils is expected. The proposed introduction of improved "housekeeping" at the Site would result in a long-term, beneficial impact on geology and soils.

Periodic construction activities associated with the construction and de-construction of temporary test structures on the GRABS Site are not expected to result in adverse impacts on geology at the Site. No deep excavation and no new wells are proposed. No significant geologic hazards are present at the GRABS Site.

Less-than-significant, adverse impacts on soils would be expected from ongoing, though periodic, construction and de-construction activities associated with the Proposed Action. Construction and de-construction activities would require the removal of existing (limited) vegetation and the disturbance of soil in the form of trenching, grading, excavating, and re-contouring. These actions would temporarily increase the potential for erosion and sedimentation. Disturbance of smaller, less than 1-acre areas, would result in minimal soils impacts. Disturbance of larger areas, equal to or greater than 1 acre in area, would include preparing and following an approved SWPPP and all applicable CGP requirements and Section 438 of the EISA (please see **Section 3.5** for a description of Section 438 of the EISA). Per the conditions of Fugitive Dust Control Programmatic Permit #P12-0007, no more than 5 acres of open ground would be exposed at any given time. DTRA would continue to revegetate as necessary to stay below the 5-acre limit. Overall, implementation of the BMPs identified in **Table 12** would ensure these soils and associated potential sedimentation impacts would be minimized.

The soils mapped at the GRABS Site are neither hydric nor prime farmland soils. However, these soils are rated as somewhat to very limited for shallow excavations, and some are limited for small buildings. DTRA would continue to conduct site-specific soil surveys prior to implementing any proposed construction activities to determine the engineering limitations and appropriate design considerations or BMPs to offset potential adverse, but less-than-significant impacts on soils.

#### 4.4.3 No Action Alternative

The No Action Alternative would result in the continuation of existing geology and soils conditions, as described in **Section 3.4.2**. No changes to existing geology and soils conditions would occur with the implementation of the No Action Alternative. The potential long-term, beneficial impact of implementing the improved "housekeeping" practices included in the Proposed Action would not occur under the No Action Alternative.

## 4.5 Water Resources

### 4.5.1 Evaluation Criteria

Evaluation criteria for impacts on water resources are based on water quantity, quality, use, and associated regulations. A proposed action would have a significant impact on water resources if it would:

- Substantially reduce water quantity or supply to existing users
- Overdraft groundwater basins
- Exceed the safe annual yield of water supply sources
- Substantially adversely affect water quality
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources

The potential impact of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

### 4.5.2 Proposed Action

The 1993 EA determined the activities currently ongoing at the GRABS Site would not adversely affect water resources (see Table 2.1 of Defense Nuclear Agency 1993). Detonation activities would not impact water resources, but increased soil erosion may impact surface waters. Erosion control measures would minimize or avoid any potential long-term, adverse impact. The 1993 EA states that extensive literature searches and contacts with personnel from the Bureau of Mines, Waterways Experiment Station, USFS, and other DOD organizations involved in HE detonations indicate that significant contamination of groundwater by detonation products has never been observed.

Water samples were collected after two known test series (i.e., detonation of three 1,000-pound charges partially buried in coralline soil at a coral atoll over a shallow freshwater lens and the detonation of six 100-ton ANFO surface charges near Lake Havasu, Arizona) and compared to federal water standards. The concentrations of detonation products for which federal standards existed (cyanide, ammonia, and nitrates) were well within the standards for potable water. Due to the relatively minor sizes of the proposed detonations at the GRABS Site and the fact that they would take place significantly above the static water table, no contamination of potable groundwater should occur (see Section 2.2.5 of Defense Nuclear Agency 1993).

Surface water resources would not be affected by the ongoing detonation activities conducted at the GRABS Site. Per the 1993 EA, gaseous detonation products are mostly consumed by the explosion or react with the atmosphere and occur in much reduced quantities even 10 to 30 seconds following a detonation. The products of potential reactions between the atmosphere and detonation products are water, CO<sub>2</sub>, and nitrogen compounds. Any concentrations of gaseous products potentially remaining diffuse into the atmosphere and would not impact surface water resources. Solid detonation products from onsite explosions may include aluminum oxide, gypsum, and carbon, all of which are normal constituents of desert soils (see Section 2.2.5 of Defense Nuclear Agency 1993). While these solid products may potentially be carried to the limited surface water resources in the vicinity of the GRABS Site, it remains unlikely that these common compounds would have any significant adverse impact on existing water resources.

Based on the findings of the 1993 EA and the analysis presented below, implementation of the Proposed Action would not result in significant adverse impacts on water resources.

**Groundwater.** Because the annual water use (2,693 acre-feet) at Kirtland AFB is well below the 6,000 acre-feet withdrawal allowed per year in the court-decreed<sup>8</sup> water right, less-than-significant, adverse impacts on groundwater availability would be expected during construction activities associated with the Proposed Action. Groundwater might be temporarily used for dust suppression during construction activities, depending on site conditions. If water applications are required for dust suppression, sufficient water resources are available on the installation; therefore, less-than-significant, adverse impacts on groundwater availability would be expected during the periodic construction activities associated with the Proposed Action.

No impacts on groundwater quality are anticipated from construction activities associated with the Proposed Action. The average depth to groundwater beneath Kirtland AFB is 450 to 550 feet bgs, and beneath the GRABS Site is 135 to 240 feet bgs (SNL 2012); therefore, groundwater would not be encountered during construction, which is not anticipated to require any deep excavations. It is also not anticipated that any potential petroleum or hazardous material spills which might occur during construction activities would reach the groundwater. Proper housekeeping, maintenance of equipment, and containment of fuels and other potentially hazardous materials would be conducted to minimize the potential for a release of fluids (see **Table 12**).

No impacts on groundwater recharge are anticipated from construction activities associated with the Proposed Action. Recharge of the Albuquerque Basin Regional Aquifer most likely occurs east of the installation in the Manzanita Mountains and, therefore, would not be affected by the Proposed Action.

As a soil bacterium, Btk does not readily percolate through the soil into groundwater. Although minimal amounts of Btk could potentially enter groundwater resources, the amount would be undetectable or several orders of magnitude lower than the levels, already deemed safe. As such, no adverse impacts on groundwater quality would be anticipated (USEPA 1998b).

**Surface Water.** The proposed testing events using Btk would not impact surface water. Btk persists for up to 1 week in the environment and breaks down in sunlight, meaning that the organism would only exist within the environment for a short amount of time. In addition, the only organisms susceptible to Btk include specific species of leaf-eating caterpillars; no other species, and specifically no aquatic species, would be impacted by the proposed release of Btk during test events (Colorado State University Extension 2008). Less-than-significant, adverse impacts on surface water and surface water quality could occur from disturbance and exposure of soils at the GRABS Site. Soil disturbance from construction activities has the potential to result in minor disruption of natural drainage patterns, contamination of storm water discharge, and heavy sediment loading.

Prior to construction, DTRA would obtain an appropriate NPDES permit (for proposed activities equal to or greater than 1 acre of ground disturbance), including submission and approval of an NOI and a SWPPP. DTRA would implement NPDES permit conditions, the site-specific SWPPP, and BMPs to control soil erosion and to limit surface water resource impacts during proposed construction activities (see **Table 12**). The USEPA recently issued a Pilot Watershed Permit. DTRA would comply with the conditions of this new permit, including implementation of any new BMP and SWPPP requirements. In addition, DTRA would comply with Section 438 of the EISA and would design the Proposed Action to meet UFC LID requirements, resulting in the

<sup>8</sup> On 3 December 1973, the U.S. District Court Judgment and Order incorporated a 27 November 1973 Stipulation of Parties to allow Kirtland AFB to draw a total of 6,398 acre-feet of groundwater from two wells within the Rio Grande Underground Water Basin (4,500 acre-feet and 1,898 acre-feet), as well as three minor decrees to draw 3 acre-feet per year of groundwater from three domestic wells.

maintenance and restoration of the natural hydrologic functions of the GRABS Site between pre- and post-construction conditions. With implementation of these BMPs, adverse impacts on surface waters would be minimized and properly controlled.

Sediment or pollutant discharges from operations at the GRABS Site are regulated under the Watershed MS4 permit. Compliance with the permit is monitored through installation sampling, which screens overall pollutant levels discharged from the installation. Site-specific monitoring is not required under this permit. Further, BMPs would be developed as part of the SWPPP to manage storm water during and after construction for larger testing activities. During construction activities, heavy equipment (e.g., bulldozers, backhoes, dump trucks, concrete mixers, asphalt vehicles) and generators would be on the Site. Fuels, hydraulic fluids, and other lubricants would likely be stored on the Site during proposed construction activities to support contractor vehicles and machinery. However, no other hazardous materials are anticipated to be stored on the Site during construction activities. Construction personnel would be required to follow appropriate BMPs to protect against potential petroleum or hazardous material spills (see **Table 12**). Proper housekeeping, maintenance of equipment, and containment of fuels and other potentially hazardous materials would be conducted to minimize the potential for a release of fluids into surface waters. In the event of a spill, procedures outlined in Kirtland AFB's Hazardous Material Emergency Planning and Response Plan would be followed to quickly contain and clean up a spill (please see **Section 4.9.2** for more information regarding potential hazardous material and waste impacts). Following construction, restoration of the GRABS Site, along with other BMPs to abate potential runoff and erosion concerns, would minimize potential adverse impacts of erosion and runoff ultimately downstream through unnamed arroyos. Proper housekeeping and retention of debris within the Site boundaries would prevent construction debris from entering waterways. Therefore no long-term, adverse impacts on surface waters are expected.

**Floodplains.** No portion of the GRABS Site falls within any identified 100- and 500-year floodplains. As such, no impacts on floodplains would be anticipated.

#### 4.5.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and the existing conditions discussed in **Section 3.5.2** would continue. Implementation of the No Action Alternative would not result in any new or additional impacts on local or regional water resources.

### 4.6 Biological Resources

#### 4.6.1 Evaluation Criteria

The level of impact on biological resources is based on the:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- Proportion of the resource that would be affected relative to its occurrence in the region
- Sensitivity of the resource to the proposed action
- Duration of ecological ramifications

Impacts on biological resources are considered significant if species or habitats of high concern are adversely affected over relatively large areas, or disturbances cause reductions in population size or distribution of a species of special concern. A habitat perspective is used to provide a framework for analysis of general classes of impacts (i.e., removal of critical habitat, noise, human disturbance).

Determination of the significance of wetland impacts is based on the:

- Function and value of the wetland
- Proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region
- Sensitivity of the wetland to proposed activities
- Duration of ecological ramifications

Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected.

Ground disturbance and noise associated with proposed construction activities might directly or indirectly cause potential adverse impacts on biological resources. Direct impacts from ground disturbance were evaluated by identifying the types and locations of potential ground-disturbing activities in relation to important biological resources. Mortality of individuals, habitat removal, and damage or degradation of habitats are impacts that might be associated with ground-disturbing activities.

Noise associated with a proposed action might be of sufficient magnitude to result in the direct loss of individuals and reduce reproductive output within certain ecological settings. Ultimately, extreme cases of such stresses could have the potential to lead to population declines or local or regional extinction. To evaluate impacts, considerations were given to the number of individuals or critical species involved, amount of habitat affected, relationship of the Site to total available habitat within the region, type of stressors involved, and magnitude of the impacts.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any federally listed threatened or endangered species. The ESA requires that all federal agencies avoid “taking” threatened or endangered species, which includes jeopardizing threatened or endangered species habitat. Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a federal agency project.

#### **4.6.2 Proposed Action**

As analyzed below, implementation of the Proposed Action would not result in significant adverse impacts on biological resources based on the criteria presented in **Section 4.6.1**.

**Vegetation.** Onsite vegetation primarily includes grassland species that can tolerate disturbance. Less-than-significant adverse impacts on vegetation would be expected from ground disturbance due to implementation of the Proposed Action. As identified in **Sections 2.2.2** and **2.2.3**, all disturbed areas would be returned to pre-project conditions following each testing event. As such, any potential adverse impacts would be reduced or avoided.

As Btk is a naturally-occurring soil bacterium, existing on site vegetation is routinely exposed to Btk. As such, test events using this biological simulant would not be expected to have adverse impacts on vegetation.

**Wildlife Species and Habitat.** Noise created during proposed construction and de-construction and ongoing test events could result in adverse impacts on nearby wildlife. These impacts would be subtle, widespread impacts from the overall elevation of ambient noise levels, potentially resulting in reduced communication ranges, interference with predator/prey detection, or habitat avoidance. More intense impacts from explosive noise associated with test activities could include behavioral changes, disorientation, or hearing loss. Predictors of wildlife response to noise include

noise type (i.e., continuous or intermittent), prior experience with noise, proximity to a noise source, stage in the breeding cycle, activity, age, and sex. Prior experience with noise is the most important factor in the response of wildlife to noise, because wildlife can adapt to the noise. The rate of adaptation to short-term construction noise is not known.

Overall, noise impacts on wildlife associated with periodic, small-scale construction and explosive test events under the Proposed Action are anticipated to be negligible and consistent with ongoing activities. Ongoing activities have produced no documented adverse impacts on local wildlife species or their habitat.

While the initiation of testing with a biological simulant would introduce a new training activity to the GRABS Site, noise associated with these events would occur only once every 2 years and would be similar to blast noise resulting from current testing activities (see **Sections 3.1.2** and **4.1.2**). Wildlife present on the GRABS Site, including associated wildlife habitat, are adapted to the noises that would occur with implementation of the Proposed Action.

The proposed implementation of test events involving a biological simulant would not introduce significant quantities of Btk to the environment. Use of Btk during testing events would not introduce a concern to wildlife species; Btk is a widely used pesticide in commercial agricultural operations to control populations of leaf-eating caterpillars. These caterpillars ingest the bacteria, where it produces proteins that react with the specific lining of the caterpillar's gut and paralyzes the digestive system. The caterpillar stops feeding within hours of Btk ingestion and subsequently dies of starvation. However, this reaction only occurs within the specific alkaline environment of the susceptible caterpillar species' digestive system. Humans and all other non-target wildlife species are considered safe from any potential impacts as their digestive system does not react with the toxic proteins produced by Btk; non-target species would not be impacted by the proposed test events. Btk degrades in sunlight and would persist for less than 1 week following a test event (Colorado State University Extension 2008). See **Appendix F** for a copy of the *Bacillus thuringiensis* Pesticide Information Profile.

The quantities of Btk proposed for release at the GRABS Site (i.e., 10 pounds per testing event) would be equivalent to the amount used by organic farmers for treating 2 acres of crops. In addition, Btk test events would only occur once every 2 years. As such, the potential impact on biological resources caused by the Proposed Action is expected to be negligible. Please see **Section 2.2.1** for additional details regarding this component of the Proposed Action.

As described in **Section 2.2.2**, the Proposed Action includes improved "housekeeping" activities at the GRABS Site. Establishing test structure clean-up dates for each test event would restore the area to current pre-test conditions and avoid the current situation of debris being left at the GRABS Site for extended periods of time. Implementing this component of the Proposed Action would result in a long-term, beneficial impact on wildlife by eliminating potential nesting locations at the GRABS Site.

In addition and as shown in **Table 12**, all proposed construction and de-construction activities would be timed or conducted to avoid adverse impacts on migratory bird species and the requirements outlined in the Kirtland AFB INRMP would be implemented. Therefore, no adverse impacts on local wildlife would be anticipated.

In a scoping response received 8 April 2013, NMDGF stated that they do not anticipate adverse impacts on wildlife or important wildlife habitats with implementation of the Proposed Action (see **Appendix E**).

**Threatened and Endangered Species.** As described in **Section 3.6.2**, no federally listed special status species are present at the GRABS Site. Construction and de-construction activities, as well as ongoing explosives testing and training events, associated with the Proposed Action would not result in adverse impacts on federally listed species.

**Wetlands.** No wetlands are present on or near the GRABS Site; therefore, no adverse impacts on wetlands would be expected with implementation of the Proposed Action.

#### **4.6.3 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented, and existing biological resources conditions would remain as discussed in **Section 3.6.2**. The potential beneficial impact of implementing the improved “housekeeping” practices included in the Proposed Action would not occur under the No Action Alternative.

### **4.7 Cultural Resources**

#### **4.7.1 Evaluation Criteria**

Adverse impacts on cultural resources associated with a proposed federal action can include:

- Physically altering, damaging, or destroying all or part of a resource
- Altering characteristics of the surrounding environment that contribute to the resource's significance
- Introducing visual or audible elements that are out of character with the property or that alter its setting
- General neglect of the resource to the extent that it is deteriorated or destroyed
- The sale, transfer, or lease of the property out of the agency ownership (or control) without adequate, legally enforceable restrictions or conditions to ensure preservation of the property's historic significance

#### **4.7.2 Proposed Action**

As analyzed below, implementation of the Proposed Action would not result in significant impacts on cultural resources based on the criteria presented in **Section 4.7.1**.

DTRA and Kirtland AFB consulted with various Native American tribes concerning this Proposed Action. One response was received from the Pueblo of Isleta, Governor's Office requesting a meeting to determine if any potential impacts on Tribal Lands exist. The meeting was held on 1 May 2013. The Tribal Liaisons requested a copy of the DOPAA once it was prepared. DTRA and the USAF provided a copy of the DOPAA and no comments were received.

DTRA and Kirtland AFB consulted with the SHPO concerning this Proposed Action. Pursuant to Section 106 of the NHPA and 36 CFR Part 800, DTRA and Kirtland AFB have identified and evaluated the Proposed Action's APE, and have determined there is one NRHP-eligible site (i.e., historic property) located within the APE. This historic property is the World War II-era Fuse Launch Pad located northwest of the GRABS Site. Because the Proposed Action is a continuation of existing activities that have occurred on the GRABS Site for over 40 years, this property would not be adversely impacted. All proposed ground-disturbing activities would occur on previously disturbed areas within the Site. The likelihood that previously unknown or undocumented sites would be encountered if either the Proposed Action or the No Action Alternative is implemented is

very low. A Cultural Resources Survey of the GRABS Site was completed in November 1993 (University of New Mexico 1993). This survey identified no cultural resources on the GRABS Site and recommended an archaeological clearance for the Site. Thus, DTRA and Kirtland AFB have concluded that the Proposed Action would not adversely impact historic properties. In written correspondence dated 11 July 2013, the SHPO concurred with DTRA's and Kirtland AFB's finding of "no effect" to historic properties from this proposed undertaking, pursuant to Section 106 of the NHPA and 36 CFR Part 800 (see **Appendix E**).

In addition, implementation of the BMPs identified in **Table 12** would ensure that inadvertent discoveries of cultural resources during short-term, periodic construction activities associated with operation of the GRABS Site are properly addressed. As such, no significant adverse impacts on cultural resources would be expected with implementation of the Proposed Action.

#### **4.7.3 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented, and existing cultural resources conditions would remain the same as discussed in **Section 3.7.2**. No adverse impacts on cultural resources would be expected from implementation of the No Action Alternative.

### **4.8 Infrastructure**

#### **4.8.1 Evaluation Criteria**

Impacts on infrastructure are evaluated based on a proposed action's potential for disruption, excessive use, or improvement of existing level of service for transportation resources, energy systems (electric, natural gas, and liquid fuels) and water consumption, sanitary sewer and wastewater systems, storm water systems, communications, and solid waste management. Impacts might arise from physical changes to traffic circulation and utility needs created by either direct or indirect workforce and population changes related to installation activities. An impact would be significant if implementation of the Proposed Action resulted in the following impacts:

- Exceeded capacity of a utility or transportation artery
- A long-term interruption of the utility or transportation artery
- A violation of a permit condition
- A violation of an approved plan for that utility

#### **4.8.2 Proposed Action**

As analyzed below, implementation of the Proposed Action would not result in significant impacts on infrastructure based upon the criteria presented in **Section 4.8.1**.

**Transportation.** No existing roadways would be altered, and no new roadways would be constructed under the Proposed Action. However, ongoing, periodic construction and de-construction activities associated with the Proposed Action have the potential to impact the transportation system through traffic delays. Early and proactive coordination with Kirtland AFB organizations would ensure necessary safety precautions are taken and would allow ample advance notice to affected commuters and personnel. These measures are identified in **Table 12**. During each testing event, Target Road may be closed to ensure the health and safety of on-installation personnel (see **Section 1.1.5.9**). Less-than-significant, adverse impacts on the transportation system resulting from implementation of the Proposed Action would be expected.

**Electrical System.** Implementation of the Proposed Action would not require the extension or installation of electrical service lines. Activities at the GRABS Site would continue to utilize existing solar-powered generators. No change in demand to the existing electrical system would occur. Therefore, no impacts on the electrical system would be anticipated.

**Natural Gas and Propane.** Implementation of the Proposed Action would not require the extension or installation of natural gas utility lines. Activities at the GRABS Site would continue to utilize existing solar-powered generators with propane back-up. No change in demand to the existing Kirtland AFB natural gas and propane use would occur. Therefore, no impacts on natural gas and propane would be anticipated.

**Liquid Fuel.** Construction and de-construction activities required during operation of the GRABS Site would not alter the quantities of liquid fuels (e.g., JP-8, diesel, gasoline) used at Kirtland AFB, nor would it affect their handling and storage. Construction contractors would use liquid fuel for their vehicles and equipment and may have a liquid fuel storage tank on site during construction activities; however, this would not affect Kirtland AFB's liquid fuel supply because it would come from off-installation. No onsite storage or disposal of liquid fuel would occur at the GRABS Site. Therefore, no impacts on liquid fuels would be expected from proposed construction activities.

**Water Supply System.** Construction and de-construction activities at the GRABS Site would require minimal amounts of water, primarily for dust-suppression purposes. This water would be obtained from the Kirtland AFB water supply system. Because the annual water use (approximately 2,693 acre-feet) on Kirtland AFB is well below the 6,000 acre-feet withdrawal allowed per year in the court-decreed<sup>9</sup> water right, less-than-significant, adverse impacts on the water supply system are anticipated.

**Sanitary Sewer/Wastewater System.** Personnel working at the GRABS Site would use portable latrines during construction and de-construction activities as well as test events. These facilities would continue to be emptied and disposed of by a contracted service on an as-needed basis. As such, no impacts on the sanitary sewer or wastewater systems are anticipated from activities associated with the Proposed Action.

**Storm Water System.** Construction and de-construction activities associated with the Proposed Action at the GRABS Site would require ground disturbance as heavy equipment would clear, grade, and contour land surfaces. These activities could temporarily increase the potential for storm water runoff to erode soil during construction activities. Soil erosion and sediment production would be minimized during construction periods by following an approved, site-specific SWPPP and implementing BMPs in accordance with the construction NPDES permit and the USEPA Pilot Watershed Permit (see **Section 4.5.2 and Table 12**). Current explosive activity levels at the GRABS Site are not expected to increase under the Proposed Action; therefore, storm water runoff generated by operations at the GRABS Site is not expected to increase pollutant loads due to the level of disturbance. With implementation of BMPs, potential adverse impacts on the storm water system would be minimized and properly controlled.

**Solid Waste Management.** To reduce the amount of construction waste, as well as waste from improved "housekeeping" activities, materials that could be recycled or reused would be diverted from landfills to the greatest extent possible, in strict accordance with the Construction Waste Management specification (Section 01 74 19). Site-generated scrap metals, wiring, clean

<sup>9</sup> On 3 December 1973, the U.S. District Court Judgment and Order incorporated a 27 November 1973 Stipulation of Parties to allow Kirtland AFB to draw a total of 6,398 acre-feet of groundwater from two wells within the Rio Grande Underground Water Basin (4,500 acre-feet and 1,898 acre-feet), as well as three minor decrees to draw 3 acre-feet per year of groundwater from three domestic wells.

ductwork, and structural steel would be separated and recycled offsite. The weights of all materials diverted for recycling or reuse would be reported to the Kirtland AFB Qualified Recycling Program to be credited toward the DOD-mandated construction and demolition diversion rate. Non-hazardous construction and demolition waste that is not recyclable or reusable would be transported to the Kirtland AFB construction and demolition waste landfill for disposal. Receptacles would be provided for municipal solid waste generated by onsite worker activity. Miscellaneous salvageable metals would be transported to the Defense Reutilization and Marketing Office for recycling or reuse. Clean fill material, ground-up asphalt, and broken-up cement would be diverted from the landfills and reused whenever possible. This would result in less-than-significant, adverse impacts on the solid waste management.

#### 4.8.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and existing infrastructure conditions would remain the same as discussed in **Section 3.8.2**. No additional impacts on infrastructure would occur at the GRABS Site or its vicinity under the No Action Alternative.

### 4.9 Hazardous Materials and Waste

#### 4.9.1 Evaluation Criteria

Impacts on hazardous materials and waste are assessed by evaluating the degree to which the Proposed Action:

- Could cause worker, resident, or visitor exposure
- Would lead to non-compliance with applicable federal and state regulations
- Would increase the amounts of hazardous materials and wastes generated or procured beyond Kirtland AFB's current waste management procedures and capacities
- Would disturb, create, or contribute to an ERP site resulting in adverse impacts on human health or the environment

#### 4.9.2 Proposed Action

Per the 1993 EA, “no hazardous or toxic wastes will be generated or disposed of on the proposed site” and “there will be no radioactive materials, hazardous or toxic chemicals used in the area” (Defense Nuclear Agency 1993).

Based on the conclusions of the 1993 EA and as analyzed below, implementation of the Proposed Action would not result in significant, adverse impacts on hazardous materials and wastes.

**Environmental Management System.** Less-than-significant, adverse impacts on the EMS Program at Kirtland AFB would be expected from implementation of the Proposed Action. An incremental increase in hazardous materials and wastes would be expected during proposed construction and de-construction activities. Adherence to the EMS Program and associated plans at Kirtland AFB, particularly the Hazardous Materials Emergency Planning and Response Plan (see **Section 3.9.2**), would reduce adverse impacts resulting from construction and de-construction activities. Standard BMPs already used by DTRA at the Site would further minimize impacts on the natural environment (see **Table 12**).

**Hazardous Materials and Petroleum Products.** Less-than-significant, adverse impacts on hazardous materials management during construction and de-construction activities would be expected. Contractors would be responsible for the management of hazardous materials and petroleum product usage, which would be handled in accordance with federal, state, and USAF regulations. Contractors obtain authorization for hazardous materials prior to bringing them onto Kirtland AFB, and all use of hazardous materials must be reported to 377 MSG/CEIE and tracked through the Enterprise Environmental, Safety, and Occupational Health Management Information System (EESOH-MIS). If a material that is less hazardous can be used, the 377 MSG/CEIE would make these recommendations. Use of the EESOH-MIS would also ensure that ozone-depleting substances (ODSs) are not used. Use of ODSs in such products as refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request for a waiver. No new chemicals or toxic substances would be used or stored at GRABS in conjunction with proposed construction and de-construction activities.

No impacts on the hazardous materials program would be expected from conducting tests using explosives or Btk. As stated in **Section 4.5.2**, detonation products released during explosive tests are naturally-occurring substances, and potential products resulting from reactions with the atmosphere are natural and non-hazardous. Likewise, Btk is a naturally-occurring bacterium; it only impacts specific species of leaf-eating caterpillars and is used as a pesticide by organic farmers. Btk is not considered a hazardous material or toxic substance.

**Hazardous and Petroleum Waste.** Less-than-significant, adverse impacts on hazardous and petroleum waste generation would be expected during proposed construction and de-construction activities. It is anticipated that the quantity of hazardous and petroleum wastes generated from the proposed construction and de-construction activities would be negligible and thus would result in less-than-significant impacts on the installation's hazardous waste management program. Site personnel would be responsible for the disposal of hazardous waste in accordance with federal and state laws and regulations and the installation's HWMP. If however, a spill does occur, the Hazardous Materials Emergency Planning and Response Plan outlines the appropriate measures for spill situations (Kirtland AFB 2008a). Implementation of the BMPs identified in **Table 12** would further reduce any potential impacts.

**Environmental Restoration Program.** As identified in **Section 3.9.2**, no MMRP sites are located within or adjacent to the GRABS Site. Therefore, no impacts on MMRP sites would be expected from implementation of the Proposed Action.

Portions of the GRABS Site are located within an active SNL ER site, SWMU-68 (see **Figure 9**). Contaminated soil at SWMU-68 was removed and confirmatory sampling was conducted. In 2010, NMED requested additional site characterization including the installation of three groundwater monitoring wells to be sampled quarterly. The eighth and final sampling event required by NMED for these monitoring wells was completed in July 2013; however, quarterly groundwater sampling and reporting will continue until additional guidance is provided by NMED. No contaminants have been detected above established maximum contaminant levels. As stated in **Section 3.9.2**, DTRA does not conduct test events in this area; therefore, no impacts would be expected to the Site from this SNL ER Site or from implementation of the Proposed Action.

**Asbestos-Containing Materials.** As identified in **Section 3.9.2**, no ACM is expected to be present at the GRABS Site; therefore, no impacts are anticipated from implementation of the Proposed Action.

**Lead-Based Paint.** As identified in **Section 3.9.2**, no LBP is expected to be present at the GRABS Site; therefore, no impacts are anticipated from implementation of the Proposed Action.

**Polychlorinated Biphenyls.** As identified in **Section 3.9.2**, no PCBs are expected to be present at the GRABS Site; therefore, no impacts are anticipated from implementation of the Proposed Action.

**Radiological Materials.** As described in **Section 3.9.2**, radiological materials are not used at the GRABS Site; therefore, no impacts are anticipated from implementation of the Proposed Action.

#### **4.9.3 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented, and existing conditions would remain the same as discussed in **Section 3.9.2**. No additional impacts on hazardous materials and wastes would occur from implementation of the No Action Alternative.

### **4.10 Safety**

#### **4.10.1 Evaluation Criteria**

A significant adverse impact on safety would occur if implementation of the Proposed Action would:

- Substantially increase risks associated with the safety of construction personnel, contractors, military personnel, or the local community
- Substantially hinder the ability to respond to an emergency
- Introduce a new health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place

#### **4.10.2 Proposed Action**

As analyzed below, implementation of the Proposed Action would not result in significant, adverse impacts on safety.

**Contractor Safety.** Implementation of the proposed construction and de-construction activities would slightly increase the health and safety risk to construction contractors at the GRABS Site during the normal workday because the level of such activity would increase. Construction contractors would be required to establish and maintain health and safety programs for their employees. Implementation of the Proposed Action would result in adverse impacts on contractor safety; however, these impacts would be expected to be less-than-significant due to the implementation of effective health and safety programs.

**Military Personnel Safety.** No impacts on military personnel health and safety would be expected from implementation of the Proposed Action. Non-essential installation personnel would be required to vacate construction and test areas. Access to the construction work sites and test areas would be limited and controlled to further reduce safety risks to installation personnel.

**GRABS Site Safety.** DTRA would continue to implement the extensive health and safety procedures and programs outlined in **Section 1.1.5.8**, including ensuring that all personnel utilizing the GRABS Site receive a UXO safety brief prior to going onsite. By continuing to implement this robust array of health and safety procedures and programs, no impacts would be anticipated (see **Appendix B**).

**Public Safety.** No impacts on public health and safety would result from the proposed construction and de-construction activities. Construction and test activities would not pose a safety risk to the public or to off-installation areas, because the GRABS Site is not publicly accessible.

Btk-related testing events would occur once every 2 years and only when winds are from the south. During ongoing testing and training events at the GRABS Site, as modified by the Proposed Action to include Btk-related testing, no adverse health and safety impacts would be anticipated.

**Radiological Safety.** As described in **Section 3.9.2**, radiological materials are not used at the GRABS Site; therefore, no impacts would be anticipated from implementation of the Proposed Action.

#### **4.10.3 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented, and existing safety conditions would remain the same as discussed in **Section 3.10.2**. No impacts on safety would occur under the No Action Alternative.

### **4.11 Socioeconomics and Environmental Justice**

#### **4.11.1 Evaluation Criteria**

**Socioeconomics.** This section addresses the potential for direct and indirect impacts that the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and/or increase employment or population. Similarly, impacts are evaluated to determine if over-stimulation of the economy (e.g., the construction industry's ability to sufficiently meet the demands of a project) could occur as a result of the Proposed Action.

**Environmental Justice.** Ethnicity and poverty data are examined for the Albuquerque metropolitan area (i.e., a 50-mile radius around Kirtland AFB) and compared to the state of New Mexico and the United States to determine if a low-income or minority population could be disproportionately affected by the Proposed Action.

**Children’s Environmental Health and Safety Risks.** This section addresses the potential for direct and indirect impacts that the Proposed Action could have on children. Potential impacts on children are evaluated according to the potential that children may be present at or in the vicinity of the Site, including the local presence of schools and daycare facilities.

#### **4.11.2 Proposed Action**

As analyzed below, implementation of the Proposed Action would not result in significant impacts on socioeconomic or environmental justice.

**Socioeconomics.** The existing construction industry within the Albuquerque MSA should adequately provide enough workers over time to support the construction and de-construction activities associated with the Proposed Action. The number of construction workers necessary to implement the Proposed Action is not large enough to outstrip the supply of the industry. The temporary increase of construction workers at Kirtland AFB would represent a small increase in the total number of persons working on the installation, but no additional facilities (e.g., housing, transportation) would be necessary to accommodate the workforce. Indirect, beneficial impacts would result from the increase in payroll tax revenues, purchase of materials, and purchase of goods and services in the area resulting in less-than-significant, beneficial impacts on the socioeconomic climate of the Albuquerque MSA.

No long-term change in employment is proposed under the Proposed Action; the GRABS Site would continue to be staffed by up to 30 onsite personnel per day during specific test events. No full-time personnel are or would be assigned to the GRABS Site.

**Environmental Justice.** The Albuquerque metropolitan area (i.e., a 50-mile radius around Kirtland AFB) contains elevated minority and low-income populations in comparison to the United States, but similar to the state of New Mexico (see **Section 3.11.2**). Construction, de-construction, and test events would occur in developed, controlled areas of a military installation; therefore, no off-installation minority populations would be disproportionately impacted by the Proposed Action. No long-term impacts on environmental justice would be anticipated.

**Children's Environmental Health and Safety Risks.** Construction, de-construction, and test events would occur in developed, controlled areas of a military installation; therefore, no off-installation youth populations would be disproportionately impacted by the Proposed Action.

#### **4.11.3 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented, and existing socioeconomic and environmental justice conditions would remain the same as discussed in **Section 3.11.2**. No impacts on socioeconomic and environmental justice would occur under the No Action Alternative.

### **4.12 Cumulative Impacts**

CEQ defines cumulative impacts as the “impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies (i.e., federal, state, and local) or individuals. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with regard to their impacts.

This section briefly summarizes past, present, and reasonably foreseeable future projects within the same general geographic and time scope as the Proposed Action. The geographic scope of the analysis varies by resource area. For example, the geographic scope of the cumulative impacts on noise, geology and soils, and safety is very narrow and focused on the location of the resource. The geographic scope of land use, air quality, infrastructure, and socioeconomics is much broader and considers more county- or region-wide activities.

The past, present, and reasonably foreseeable projects, identified below, make up the cumulative impact scenario for the Proposed Action. The cumulative impact scenario is then added to the Proposed Action’s impacts on the individual resource areas analyzed in **Sections 4.1 through 4.11** to determine the cumulative impacts of the Proposed Action. In accordance with CEQ guidance, the current impacts of past actions are considered in aggregate as appropriate for each resource area without delving into the historical details of individual past actions.

#### **4.12.1 Impact Analysis**

##### **4.12.1.1 Past Actions**

Kirtland AFB has been used for military missions since the 1930s and has continuously been developed as DOD missions, organizations, needs, and strategies have evolved. Development and operation of training ranges have impacted thousands of acres with synergistic and cumulative impacts on soil, wildlife habitats, water quality, and noise. Beneficial impacts also have resulted from the operation and management of Kirtland AFB including increased employment and

income for Bernalillo County, the city of Albuquerque, and its surrounding communities; restoration and enhancement of sensitive resources such as Coyote Springs wetland areas; consumptive and nonconsumptive recreation opportunities; and increased knowledge of the history and pre-history of the region through numerous cultural resources surveys and studies.

#### 4.12.1.2 Present and Reasonably Foreseeable Actions

Kirtland AFB is a large military installation that is continually evolving. Projects that were examined for potential cumulative impacts are included in **Table 16**.

**Table 16. Present and Reasonably Foreseeable Actions at Kirtland AFB**

Project Name	Description
Hercules Tanker Plane Recapitalization	The 58th Special Operations Wing proposes to recapitalize existing Special Operations Force tanker aircraft and flight simulators and increase the number of their training fleet. Existing HC/MC-130P/N fixed-wing tanker planes and flight simulators are approaching their service life limits and need to be replaced. The Special Operations Force training force would increase by 171 and the average daily student population would increase by 37. As part of this project, six military construction projects are planned for the installation totaling 146,440 square feet.
Manzano Small Arms Range	The USAF proposes to establish and use a small arms range in the southeastern section of Kirtland AFB, approximately 0.25 mile east of the AFRL Starfire Optical Range facilities along Mount Washington Road. The proposed range would encompass the existing M60 range. It would include two firing positions and firing lines and will use the existing targets at the M60 range. Firing distance will be approximately 7,300 feet. Firing position two would be used for sniper heavy weapons (0.50 caliber) and would fire in a more southerly direction to the existing target area, approximately 3,800 feet.
Construct New Hot Cargo Pad	The USAF proposes to construct, operate, and maintain a hot cargo pad at Kirtland AFB to ensure reliable support and backup for the existing hot cargo pad (Pad 5). Other components include construction of a new taxiway to the proposed hot cargo pad; replacement of the deteriorating taxiway to Pad 5; addition of new and relocation of existing anti-ram barriers, defensive fighting positions, and personal shelters surrounding the proposed hot cargo pad and Pad 5; addition of new lighting at the proposed hot cargo pad and Pad 5; and removal of existing lighting at Pad 5. The new pad would consist of 18-inch Portland cement concrete and would add an additional 6-inch asphalt taxiway to the existing taxiway at Pad 5. The new pad would adjoin the existing Pad 5 to minimize enlargement of the clear zone and impacts on other critical facilities.
Construction and Demolition of Military Support Facilities	Kirtland AFB proposes to demolish and construct several military personnel support facilities in the developed area in the northwestern portion of the installation. The areas include the Visiting Office Quarters Complex, the Main Enlisted Dormitory Campus, the Noncommissioned Office Academy, and Dormitory Campus 2. This project would include the demolition of facilities totaling approximately 498,000 square feet and construction of facilities totaling approximately 389,000 square feet, resulting in a net decrease of approximately 109,000 square feet of building space on the installation.
Construct New Military Working Dog Facility	USAF proposes to construct a new Military Working Dog facility. The proposed facility would consist of 14 indoor/outdoor kennels, 4 isolation kennels, storage and staff space, restrooms, food storage room, a covered walkway, and a veterinarian examining room, totaling 8,000 square feet. A parking area with 25 spaces and new access roads would also be constructed as part of the project. Demolition of facilities totaling 2,520 square feet would also be included in this project, resulting in a net increase of 5,480 square feet of building space on the installation.
Additional Development, Testing Use, and Associated Training at the TEAMS	DTRA and USAF propose to enhance the testing and training capabilities and use, as well as the functionality of the TEAMS. Specifically, the proposed facilities and activities include: a new radiological source storage facility, a new picnic area, a mock train station, conversion of an existing onsite building to a Command and Control Center/Very Important Person Monitoring Station, in-kind replacement of current TEAMS temporary buildings with permanent buildings, potential increase in testing and training event personnel levels by up to 50 percent, and additional onsite weed control efforts to reduce onsite puncture vine populations.

**Table 16. Present and Reasonably Foreseeable Actions at Kirtland AFB (continued)**

<b>Project Name</b>	<b>Description</b>
498th Nuclear System Wing Facility	USAF proposes to construct a 32,400-square-foot facility to house the newly formed 498th Nuclear Systems Wing. This facility would be a two-story, steel-framed structure with reinforced concrete foundation, floors, and reinforced masonry walls. The construction further includes tying into utilities and communications and parking for 120 vehicles. The facility would accommodate approximately 200 personnel. The new facility location is proposed between G and H Avenues, west of Wyoming Boulevard, directly behind the Nuclear Weapons Center (Building 20325).
Air Force Nuclear Weapons Center Sustainment Center	Kirtland AFB proposes to construct a 15,946-square-foot sustainment center for the Nuclear Weapons Center. This facility will be a two-story, steel-framed structure built as a Sensitive Compartmented Information Facility with reinforced concrete foundation, floors, and reinforced masonry walls. The construction further includes tying into utilities and communications and parking for vehicles. The facility will accommodate approximately 36 personnel. The new facility location is proposed between G and H Avenues west of Wyoming Boulevard directly behind the Nuclear Weapons Center (Building 20325) and south of the proposed 498th Nuclear Systems Wing facility.
Building Demolition at Kirtland AFB	The USAF is in the process of demolishing 23 buildings totaling approximately 105,000 square feet on Kirtland AFB to make space available for future construction and to fulfill its mission as installation host through better site utilization. None of the buildings proposed for demolition are currently occupied or used by installation personnel. General demolition activities would include removing foundations; removing floor, wall, ceiling, and roofing materials; removing electrical substations providing power to these facilities; and removing, capping, and rerouting sewer, gas, water, and steam lines outside of the work areas. Equipment such as bulldozers, backhoes, front-end loaders, dump trucks, tractor-trailers, and generators would be required to support the proposed demolition activities.
Security Forces Complex	The USAF proposes to construct, operate, and maintain a 42,500 square foot security forces complex at Kirtland AFB to provide adequate space and modern facilities to house all 377 Security Forces Squadron administrative and support functions in a consolidated location. The 377 Security Forces Squadron functions that will be transferred to the new security forces complex include a base operations center with command and control facility, administration and office space, training rooms, auditorium or assembly room, guard mount, hardened armory for weapons and ammunition storage, confinement facilities, law enforcement, logistics warehouse, general storage, vehicle garage with maintenance area, and associated communications functions. One existing building (879 square feet) within the footprint of the security forces complex will be demolished. This project will result in an increase of 41,621 square feet of building space on the installation.
21st Explosive Ordnance Division Expansion	The 21st Explosive Ordnance Division proposes facility expansion and site improvements for the 21st Explosive Ordnance Division Weapons of Mass Destruction Company Complex at Kirtland AFB. 21st Explosive Ordnance Division currently operates from a 90-acre property leased by the Army within Kirtland AFB. The current site has seven structures, six of which are substandard and do not have adequate fire protection. 21st Explosive Ordnance Division proposes to expand this site to a total of 280 acres, add three permanent structures totaling 40,000 square feet, demolish five of the six substandard structures (75,000 square feet), add two temporary storage containers, tie in to nearby utilities, construct water tanks for fire suppression, and construct several concrete pads for training tasks. This project would result in a decrease of 35,000 square feet of building space on the installation.
Construction, Operation, and Maintenance of a New Fire Station	The USAF proposes to construct, operate, and maintain a new Fire Station south of the intersection of Pennsylvania Street and Power Line Road. The proposed 7,320-square foot facility would consist of a non-combustible, one-story structure with three high-bay, drive-through apparatus stalls; separate men's and women's restroom with lockers and showers; separate men's and women's sleeping rooms; a separate captain's sleeping room and restroom; and a day room with a kitchen.

#### 4.12.2 Cumulative Impact Analysis by Resource Area

##### 4.12.2.1 Noise

The noise generated by the Proposed Action, including construction, de-construction, and explosive test events, would be short-term and temporary in nature. The number of test events conducted each year would not increase. BMPs outlined in **Table 12**, including restricting truck traffic during sensitive nighttime hours and selecting routes as far away from sensitive receptors as possible, would minimize impacts. The noise impacts generated by the proposed and future projects would result in only temporary increases in ambient noise levels during construction activities. The Proposed Action, when combined with other past, present, and reasonably foreseeable projects on Kirtland AFB (see **Table 16**), would not result in significant cumulative impacts on noise.

##### 4.12.2.2 Visual Resources

Impacts on visual resources generated by the Proposed Action include construction and de-construction of specific test structures and explosive test events involving balloons and would be short-term and temporary in nature. BMPs outlined in **Table 12**, including the de-construction of test structures at the conclusion of each test event would minimize impacts. The addition of improved housekeeping under the Proposed Action would contribute a beneficial cumulative impact on visual resources in the area by eliminating test-related debris on the Site for extended periods of time. Although the collective implementation of the various past, present, and reasonably foreseeable projects at Kirtland AFB could result in cumulative impacts on visual resources at Kirtland AFB, impacts would not be significant. Cumulative impacts on visual resources would be controlled by following the *Kirtland Air Force Base Architectural Compatibility Plan* (Kirtland AFB 2007). This plan attempts to ensure future development is performed in a way that limits impacts on visual resources and is consistent with existing architectural and visual standards. Ongoing adherence to the Architectural Compatibility Plan would prevent significant visual cumulative impacts from occurring in the future. The Proposed Action, when combined with other past, present, and reasonably foreseeable projects on Kirtland AFB (see **Table 16**), would not result in significant cumulative impacts on visual resources.

##### 4.12.2.3 Air Quality

Construction, de-construction, and explosive test events under the Proposed Action would result in low levels of air emissions below *de minimis* threshold limits and would not be regionally significant. The Proposed Action would generate emissions below 10 percent of the emissions inventory for the AMRG1 AQCR, and the majority of emissions would be short-term and temporary in nature. BMPs outlined in **Table 12**, including dust suppression, stabilization of previously disturbed areas, and shutting down machinery and equipment when not in use for extended periods of time would minimize impacts. Therefore, the Proposed Action, when combined with other past, present, and reasonably foreseeable projects at Kirtland AFB (see **Table 16**), would not result in significant cumulative impacts on air quality at Kirtland AFB or regionally.

##### 4.12.2.4 Geology and Soils

The Proposed Action and other local actions would neither reduce prime farmland soils nor agricultural production. The Proposed Action would not affect local or regional geology. BMPs outlined in **Table 12**, including the development and implementation of a site-specific SWPPP, would be implemented to control erosion during larger construction activities and explosive test events, which would minimize impacts. The Proposed Action, when combined with other past, present, and reasonably foreseeable projects at Kirtland AFB (see **Table 16**), would not result in significant cumulative impacts on geology and soils.

#### 4.12.2.5 Water Resources

The Proposed Action would not increase personnel located on Kirtland AFB and the annual water use (approximately 2,693 acre-feet) on Kirtland AFB is well below the 6,000 acre-feet withdrawal allowed per year in the court-decreed<sup>10</sup> water right. Water used for dust suppression during construction and de-construction activities associated with the Proposed Action would not result in significant impacts on groundwater availability or quality. Implementation of the Proposed Action would not impact any designated floodplains and impacts on surface waters would be controlled through implementation of the BMPs identified in **Table 12**. The facilities presented in **Table 16** would be constructed in accordance with environmental considerations, including water conservation (e.g., using low flow toilets, etc.). Therefore, the Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB, would not result in a significant cumulative impact on water resources.

#### 4.12.2.6 Biological Resources

The Proposed Action would occur in areas that have either been previously disturbed or areas that do not contain much vegetation or important biological habitats. No wetlands or federally listed species would be affected. BMPs identified in **Table 12**, to include compliance with all requirements and management measures identified in the Kirtland AFB INRMP would minimize impacts. Although growth and development can be expected to continue outside of Kirtland AFB and within the surrounding natural areas, significant adverse impacts on these resources would not be expected. The Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB (see **Table 16**), would not result in a significant cumulative impact on biological resources.

#### 4.12.2.7 Cultural Resources

There are no known cultural resources within the footprint of the GRABS Site. However, there is one NRHP-eligible site located within the APE. During the Section 106 Consultation Process, SHPO concurred that implementation of the Proposed Action would not negatively impact this historic property. BMPs identified in **Table 12**, to include compliance with all requirements and management measures identified in the Kirtland AFB ICRMP would ensure that inadvertent discoveries of cultural resources during short-term, periodic construction activities are properly addressed and would minimize impacts (Kirtland AFB 2006). The Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB (see **Table 16**), when compared to the condition of the structures and the potential disturbances to cultural resources, would not result in significant cumulative impacts.

#### 4.12.2.8 Infrastructure

The Proposed Action has the potential to impact the following infrastructure resources: transportation, water resources, storm water resources, and solid waste management. These impacts are anticipated to be short-term and temporary in nature. BMPs identified in **Table 12**, to include timing construction traffic to avoid peak travel hours and implementing sediment controls; offsite sediment tracking and dust control; runoff management; post-construction storm water management, erosion control, and soil stabilization; construction and non-construction waste materials management through the diversion of construction debris from landfills; and spill/release prevention from construction vehicles and equipment, would minimize impacts. Upgrade of any

<sup>10</sup> On 3 December 1973, the U.S. District Court Judgment and Order incorporated a 27 November 1973 Stipulation of Parties to allow Kirtland AFB to draw a total of 6,398 acre-feet of groundwater from two wells within the Rio Grande Underground Water Basin (4,500 acre-feet and 1,898 acre-feet), as well as three minor decrees to draw 3 acre-feet per year of groundwater from three domestic wells.

infrastructure to support additional projects at Kirtland AFB (see **Table 16**) would largely result in beneficial impacts for the installation due to increased energy efficiency. The General Plan addresses the capacity and the need to update all elements of the installation infrastructure to support additional projects at Kirtland AFB. The Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB, would not result in a significant cumulative impact on infrastructure.

#### **4.12.2.9 Hazardous Materials and Waste**

The Proposed Action would result in short-term, temporary increases in the use of hazardous materials and petroleum products and generation of waste. BMPs identified in **Table 12**, to include, compliance with existing installation SOPs and applicable laws governing the use, generation, storage, or transportation of solid or hazardous materials; ensuring vehicles are properly serviced and not leaking; and complying with the installation's Hazardous Material Emergency Planning and Response Plan should a spill occur, would minimize impacts. The Proposed Action, as well as future projects at Kirtland AFB (see **Table 16**), would incorporate measures to limit or control hazardous materials and waste into their design and operation plans. Therefore, the Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB, would not result in a significant cumulative impact on hazardous materials and wastes.

#### **4.12.2.10 Safety**

No adverse cumulative impacts on health and safety would be expected. The continued implementation of effective HASPs, which comply with federal, state, and local OSHA requirements, at the GRABS Site, and across Kirtland AFB, during construction and operation activities would reduce or eliminate health and safety impacts on contractors, military personnel, and the general public. The Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB (see **Table 16**), would not contribute to adverse cumulative impacts on safety.

#### **4.12.2.11 Socioeconomics and Environmental Justice**

The Proposed Action would result in short-term, beneficial impacts on the region's economy through the purchase of construction materials and providing employment for construction personnel during the construction and de-construction phases of the Proposed Action, over time. No impacts on employment, residential areas, population, children, or minority or low-income families on or off of the installation would occur. The Proposed Action, when combined with other past, present, and reasonably foreseeable actions at Kirtland AFB (see **Table 16**), would not contribute to adverse cumulative impacts on socioeconomics and environmental justice.

#### **4.12.3 Unavoidable Adverse Impacts**

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

**Energy.** The use of non-renewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the use of fossil fuels, a non-renewable natural resource, during construction and de-construction activities associated with the Proposed Action.

**Geology and Soils.** Construction, de-construction, and explosive test event activities would result in temporary soil disturbance; however, implementation of BMPs and erosion-control measures would limit environmental impacts. Although soil disturbance would be unavoidable, the impact on geology and soils would be negligible.

**Hazardous Materials and Waste.** The use and generation of hazardous materials and wastes during construction and de-construction activities would be unavoidable; however, these materials and wastes would be handled in accordance with federal, state, and local policies and would not be expected to result in significant impacts.

#### **4.12.4 Compatibility of the Proposed Action with the Objectives of Federal, Regional, and Local Land Use Plans, Policies, and Controls**

The Proposed Action would occur entirely within Kirtland AFB. Construction, operation, and maintenance activities would not be incompatible with any current land uses on Kirtland AFB. The Proposed Action would not conflict with any applicable off-installation land use ordinances. The Proposed Action would follow all applicable permitting, building, and safety requirements.

#### **4.12.5 Relationship between Short-Term Uses and Long-Term Productivity**

Short-term uses of the biophysical components of the human environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Implementation of the Proposed Action would not require short-term resource uses that would result in long-term compromises of productivity. The Proposed Action would not result in intensification of land use at Kirtland AFB or within the surrounding area. Implementation of the Proposed Action would not represent a loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any adverse cumulative impacts on land use or aesthetics.

#### **4.12.6 Irreversible and Irretrievable Commitment of Resources**

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the impacts that the use of these resources will have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). The irreversible and irretrievable commitments of resources that would result from implementation of the Proposed Action involve the consumption of material resources used for construction, energy resources, biological resources, and human labor resources. The use of these resources is considered to be permanent.

**Material Resources.** Material resources used for the Proposed Action would potentially include building materials, concrete and asphalt, and various construction materials and supplies. The materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

**Energy Resources.** Energy resources used for the Proposed Action would be irretrievably lost. This includes petroleum-based products (e.g., gasoline and diesel). During construction and de-construction activities, gasoline and diesel would be used for the operation of vehicles and

construction equipment. Consumption of these energy resources would not place a significant demand on their availability in the region; therefore, less-than-significant impacts would be expected.

**Biological Resources.** The Proposed Action would result in a negligible loss of vegetation and wildlife habitat. Because the project area consists primarily of bare ground with minimal vegetation, the loss would be minimal and not considered significant. The only species specifically impacted by the Proposed Action would be certain leaf-eating caterpillars, which are not known to occur in the limited vegetation and arid desert habitat currently existing at the GRABS Site. Only minimal, if any, loss of insect life may occur due to the Proposed Action; this would not constitute a significant adverse impact to biological resources.

**Human Resources.** The use of human resources for construction, operation, and maintenance activities is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

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## **APPENDIX A**

**FONSI FOR THE EA FOR RELOCATION OF SELECTED RESEARCH SYSTEMS  
FROM CERF AREA TO GRABS SITE  
KIRTLAND AIR FORCE BASE, NEW MEXICO  
(MAY 1993)**



FIELD COMMAND DEFENSE NUCLEAR AGENCY  
KIRTLAND AIR FORCE BASE, NEW MEXICO

DRAFT ENVIRONMENTAL ASSESSMENT  
FOR  
RELOCATION OF SELECTED RESEARCH SYSTEMS FROM  
CERF AREA TO GRABS SITE  
KIRTLAND AIR FORCE BASE, NEW MEXICO

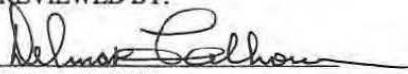
MAY 1993

"Prepared in accordance with AFR 19-2 in compliance with the  
National Environmental Policy Act of 1969."

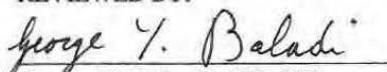
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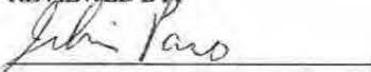
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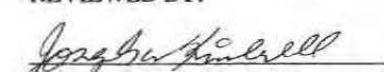
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**DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)**  
for Relocation of Selected Research Systems from CERF Area to GRABS Site

#### 1. DESCRIPTION OF THE PROPOSED ACTION

Field Command Defense Nuclear Agency (FCDNA) proposes the relocation and operation of several major research systems from the current Civil Engineering Research Facility (CERF) on Kirtland Air Force Base (KAFB), Bernalillo County, NM, to the Giant Reusable Air Blast Simulator (GRABS) Site, also on KAFB. The GRABS Site is approximately 7200 feet (1.4 miles) east of the CERF area and encompasses 155 acres. The purpose of the proposed action is to meet FCDNA requirements to develop high confidence assessments of the survivability and vulnerability of hardened systems to the blast and shock effects of nuclear and conventional weapons.

Under the proposed action, high explosive (HE) simulators for creating airblast and ground shock environments will be relocated to the GRABS site. Test structures will be placed within these simulators to test their response to blast/shock loading. Explosive sizes will be kept to the minimum required to meet test objectives and not result in any injury to humans or damage to nearby structures. The largest proposed detonation will be equivalent to 1000 lbs of TNT.

The following research systems are proposed for relocation under this action: (1) 6-foot (HST-6) Shock Tube; (2) 2-foot (HST-2) Shock Tube; (3) 7-inch (HST-7-inch) Shock Tube and Protective Shelter; (4) Shallow Water Shock Tank; (5) Detonation Tank; and (6) Half-Space Apparatus. The proposed action may also require siting of an office/storage complex, the construction of an instrumentation van shelter, the leveling and clearing of individual testbeds, borehole drilling, shallow trenching for instrumentation emplacement, fencing, grading, and the construction of minor roadways. Approximately 9.2 acres of land will be disturbed, which includes all roadways and testbed development, and amounts to 6.0 percent of the total acreage being evaluated under this action.

## 2. ANTICIPATED ENVIRONMENTAL EFFECTS

As noted within the Environmental Assessment, there is some potential for short-term unavoidable effects from the proposed action. These effects have been carefully considered, and it is concluded that they will be minor in nature.

The construction activities of the proposed action will not result in any significant impact to the environment. Some flora and fauna habitat will be lost as a result of the site preparation activities; however, the amount lost will be insignificant when compared with the expanse of the surrounding ecosystem. There is some potential for increased erosion at the proposed test site as the result of site preparation and temporary road construction; however, erosion prevention measures will be implemented during site activities and the potential damage will be minimal due to the relatively small area of land to be disturbed.

Most environmental consequences of the operations of the proposed action will be from the effects of the proposed detonations and potential interferences with other ongoing KAFB operations. A high explosive detonation results in the generation of airblast and ground shock. While the proposed action will create such effects, given the operational constraints these will not lead to a significant environmental effect. No humans or large animals will be injured by the airblast, ground shock, ejecta, or fragmentation of any of the proposed detonations. No existing structures will be damaged by the proposed detonations. Some of the detonations will result in noise levels capable of causing human "startle"; however, advanced notification should mitigate any adverse effects. No significant degradation of the air quality will occur from the detonation products or dust resulting from any of the proposed detonations. There is no reasonable potential for any contamination of ground or surface waters by the proposed action. The proposed action does not pose any severe threat to any endangered or threatened flora or fauna, or to any archaeological, historical, cultural, or paleontological resources.

The proposed action will result in some minor changes in the use of the land involved. However, since the land is designated as a hazard area for the operation of an explosive-driven shock tube and explosive-driven air blast simulator, the proposed action is consistent with the current land use. Future options for the use of the area will not be affected. There will be no radioactive material or electromagnetic radiation sources used in the area. The proposed activity will not significantly affect the activity systems of KAFB. The proposed action will not significantly alter the socioeconomic of the surrounding KAFB and Albuquerque metropolitan

areas. The magnitude of the proposed operation is minuscule compared to the continuing actions of KAFB. No additional employment is projected for this action.

### 3. FINDINGS AND CONCLUSIONS

Based on the Environmental Assessment, it is concluded that the proposed action will not significantly affect, either directly or indirectly, the quality of the human environment consistent with guidelines established in the National Environmental Policy Act and the regulations developed by the Council on Environmental Quality, the Department of Defense, the Department of the Air Force, and the Defense Nuclear Agency. It is unlikely that the proposed action will be scientifically or environmentally controversial; therefore, an Environmental Impact Statement has not been proposed for this action.

## **APPENDIX B**

**EXAMPLE EXPLOSIVES SITE PLANS, STANDARD OPERATING PROCEDURES,  
HEALTH AND SAFETY RISK ANALYSIS, AND  
GRABS SITE NOISE MANAGEMENT PROCESS**





**DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD  
2461 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22331-0600**

'AUG 31 2010

DDESB-PE

**MEMORANDUM FOR HEADQUARTERS AIR FORCE SAFETY CENTER  
(ATTENTION: SEW)**

**SUBJECT: DDESB Final Approval for AFMC-Kirtland AFB-10-S059 through S061, Three Fragmenting Disposal Ranges, Facilities GRABS-500, 700, and 900, Kirtland AFB, NM**

- References:
- (a) HQ AFSC/SEW Memorandum of 07 June 2010, Subject: Request Routine Processing and Final Approval of Explosives Site Plans (ESP), AFMC-Kirtland AFB-10-S059 through S061, Three Fragmenting Disposal Ranges, Facilities GRABS-500, 700, and 900, Kirtland AFB, NM
  - (b) DoDM 6055.09-M, DoD Ammunition and Explosives Safety Standards, 29 February 2008, Administratively Reissued 4 August 2010

The Department of Defense Explosives Safety Board (DDESB) Staff has reviewed the subject site safety submission, forwarded by reference (a), with respect to explosives safety criteria in reference (b). Based on the information provided, final safety approval is granted for three fragmenting disposal ranges at Kirtland AFB, NM. The following pertain to this approval:

- a. The three ranges are approved for non-fragmenting explosives with the net explosive weight (NEW) listed in the table below.

Site Plan	Range	HD 1.1	HD 1.2.1	HD 1.2.2	HD 1.2.3	HD 1.3	HD 1.4
AFMC-Kirtland AFB-10-S059	GRABS-500	500	None	None	None	None	None
AFMC-Kirtland AFB-10-S060	GRABS-700	700	None	None	None	None	None
AFMC-Kirtland AFB-10-S061	GRABS-900	900	None	None	None	None	None

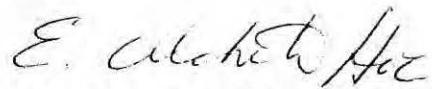
- b. Per reference (a), the three ranges are limited to fragmenting munitions with maximum diameters and maximum NEW listed in the table below.

Site Plan	Range	Limits	Robust	Heavy Cased	Non-Robust
AFMC-Kirtland AFB-10-S059	GRABS-500	Maximum Diameter, in Maximum NEW, lbs	3.44 0.32	3.37 0.24	4.88 7.91
AFMC-Kirtland AFB-10-S060	GRABS-700	Maximum Diameter, in Maximum NEW, lbs	4.02 0.58	3.97 0.37	6.44 26.55
AFMC-Kirtland AFB-10-S061	GRABS-900	Maximum Diameter, in Maximum NEW, lbs	4.54 0.94	4.49 0.52	8.08 71.86

- c. Concurrent operations at the three ranges are not permitted.
- d. Roads will be closed to unrelated personnel during the explosives operations.

A copy of the complete site plan package and this approval letter must be maintained as a permanent record at the installation of origin. Master planning documents and installation drawings must be updated to reflect this site plan.

Point of contact is Mr. Aly Kewan, he can be reached at DSN: 221-1240; commercial: 703-325-1240; and E-mail: Aly.Kewan@ddesb.osd.mil.



CURTIS M. BOWLING  
Chairman  
DDESB



## DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

### MEMORANDUM FOR AFSC/SEW

FROM: HQ AFMC/SEW  
4375 Chidlaw Road  
Bldg. 262, Room S-154  
Wright Patterson AFB, OH 45433-5006

SUBJECT: Request Routine Processing and Final Approval of Explosives Site Plans (ESP), AFMC-Kirtland AFB-10-S59 thru S61, Disposal Range, Fragmenting, GRABS Areas.

1. Request routine processing and final approval for siting three separate Disposal Ranges (GRABS-500, GRABS-700, & GRABS-900) that support day-to-day operations and has been evaluated for compliance with ammunition and explosives (AE) safety standards. Each GRABS Disposal Range complies with all explosives safety and environmental standards. The following information is provided for review and processing:

- a. There is no construction involved with this submission. This ESP was produced using the AFMAN 91-201, *USAF Explosives Safety Standards and Assessment System for Hazard Surveys II* (ASHS) software, Version 2481, Databasc 60 was utilized. Each PES location complies with explosives safety Quantity-Distance (Q-D) criteria.
- b. Subject ESP sites three separate Disposal Range. The requested Net Explosive Weight For Quantity Distance (NEWQD) is as follows:

<i>Range</i>	<i>HD 1.1</i>	<i>HD 1.2.1</i>	<i>HD 1.2.2</i>	<i>HD 1.2.3</i>	<i>HD 1.3</i>	<i>HD 1.4</i>
GRABS-500	500	None	None	None	None	None
GRABS-700	700	None	None	None	None	None
GRABS-900	900	None	None	None	None	None

- c. A combined Inhibited Building Distance (IBD) and Evaluation Zone (EZ) clear-zone of 2,604, 2,913, and 3,167 feet, respectively, was used to verify that surrounding PESs do not hazard this location and Exposed Sites (ES) locations are not hazarded by the PES. This block siting approach will provide the using organization with the flexibility to conduct explosive operations within each of the GRABS locations as their testing mission warrants. Intentional detonations on each of the GRABS will be conducted IAW AFMAN 91-201, paragraph 12.74 requirements.
- d. These ESPs supersede AFMC/DNA-Kirtland-93-S01 (*Attachment 2 of original ESP*) upon receipt of DDESB approval.
- e. A glass breakage risk analysis determined that there are no facilities that contain glass windows within the IBD of these PES locations and no injury hazard exists to personnel working at these PES locations.
- f. A Lightning Protection System (LPS) is not required for these locations since it will interfere with disposal range operations. An installation lightning protection system is used to notify personnel when to cease explosive operations when lightning is detected.

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- g. Compensatory measures have been established to ensure no concurrent use of GRABS-500, GRABS-700, and GRABS-900 while a single GRABS site is in use. To protect unrelated personnel, control measures have been established to limit access to all roads depicted on the ESP site maps by related personnel only during explosives operations. The compensatory measures associated with each ESP have been accepted by the installation commander.
  - h. Electro-Magnetic Radiation (EMR) hazards were analyzed for each PES location and determined that there were no EMR hazards associated with these ESPs.
  - i. All utilities are located underground for at least 50 feet. All roadway and taxiways depicted within the clear zones are controlled and restricted to use by related personnel that support these ESPs.
2. This office concurs with the subject request and recommends final approval. Please direct questions or comments pertaining to this ESP to me at DSN 787-1366 or [nathan.herro@wpafb.af.mil](mailto:nathan.herro@wpafb.af.mil).

NATHAN HERRO, GS-13, USAF  
Weapons Safety Manager

Attachment:  
ESP Package, AFMC-Kirtland-10-S59, -S60, & -S61

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DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 377TH AIR BASE WING (AFMC)

APR 6 2010

MEMORANDUM FOR AFMC/SEW  
4375 Chidlaw Road, Suite 6  
Wright-Patterson AFB OH 45433

FROM: 377 ABW/CC  
2000 Wyoming Blvd SE  
Kirtland AFB NM 87117-5606

SUBJECT: Routine Processing of Explosives Site Plan (ESPs) AFMC-Kirtland-10-S59 through S61,  
Disposal Range, Fragmenting

1. Request routine processing and approval of subject ESP for the purpose of siting three detonation areas.
2. The requested ESP will not involve new construction. This site plan is submitted to establish three areas, GRABS-500, GRABS-700, and GRABS-900, for detonation of up to 500, 700, and 900 pounds to support test and evaluation operations. These ESPs rescind AFMC-Kirtland-93-S1.
3. Subject ESP package is submitted in accordance with Air Force Manual 91-201, *Explosives Safety Standards*, dated 18 November 2008. This ESP is submitted with no violations to explosives safety criteria. There are compensatory measures associated with the three ESPs.
4. This package includes a scaled explosives site plan PES/ES map and AF Form 943, *Explosives Site Plan* to illustrate the relationships and requirements between surrounding exposures and the facility being sited. This site plan was computer generated using ASHS, version 2481, database 60.
5. The following information is provided to assist in the review of this ESP:

- a. Net explosives weight authorizations for the GRABS-500, GRABS-700 and GRABS-900 are:

Fac No	ESP No	1.1	1.1 (xx)	1.2.1 MCE	1.2.1 > 100	1.2.1 < 100	1.2.2	1.2.3	1.2.3 (xx)	1.2.3 MCE	1.3	1.4
GRABS-500	S59	500	0	0	0	0	0	0	0	0	0	0
GRABS-700	S60	700	0	0	0	0	0	0	0	0	0	0
GRABS-900	S61	900	0	0	0	0	0	0	0	0	0	0

- b. Test sites listed in DDESB Approval Letter 93-S1, 5 Jan 1995, a. through l, are test articles used for explosive testing. The owner accepts the risk of damage during explosive operations. These test articles will be decommissioned, moved, reused, or removed from the area as required. See attachment 2
- c. The smallest area, GRABS-900, will be used to detonate up to 900 pounds of hazard class/division 1.1. GRABS-700 and GRABS-500 expand outward to allow more space for lesser net explosives weights (NEWS). The site plans are composed in a manner that as the explosives footprint expand outward, the NEWS decrease. This will help prevent complete decimation (cratering) of the same small area caused by repeated detonations and give test and evaluation operations flexibility.

d. Compensatory Measures:

(1) Each test director will ensure GRABS-500, GRABS-700, and GRABS-900 will not be used concurrently. All test will be scheduled through the CFAC.

(2) GRABSPL-1 is an abandoned power line. The lines are capped and the transformer was removed. This power line was for a control van used at GRABS and has not been used in 20 years.

e. Personnel will evacuate beyond inhabited building distance prior to detonations in any of the areas.

f. The proposed location will not utilize a lightning protection system however, the area is served by a lightning detection system and personnel will cease operations when lightning approaches 5 nautical miles of Kirtland AFB.

g. Electro-Magnetic Radiation (EMR) hazards were evaluated. Our analysis shows no EMR hazards to the area being sited.

h. There are no facilities with glass panes within the Inhabited building Distance (IBD) of the GRABS, therefore, no explosives glass breakage assessments are required for the subject locations.

i. Roads: All roads within IBD are dirt range roads that will be closed during operations at any of the three areas.

j. The proposed explosives IBD clear zones for all three areas fall within the installation boundary.

k. The proposed siting has been coordinated and reconciled with the base community planner. GRABS Range occupies the same footprint as previous Explosive Site Plans.

l. Fragmenting detonations are permitted only if the fragments are contained within the distance listed in Explosive Site Plan Section III, Column 8.

6. For further assistance concerning this site plan, please contact my POC David Crutchfield at DSN 246-9142 or by email at charles.crutchfield@kirtland.af.mil.

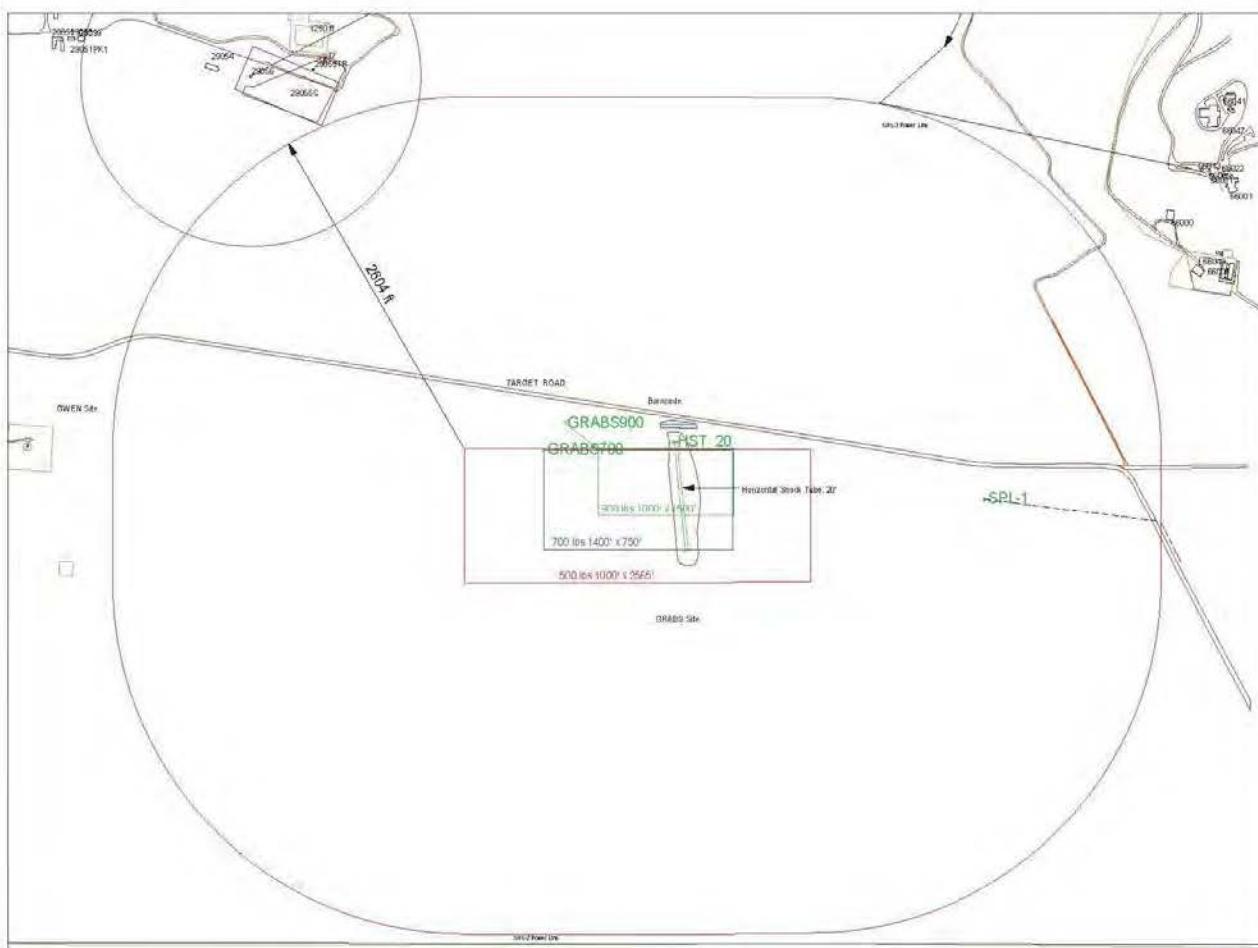


MICHAEL S. DUVALL, Colonel, USAF  
Commander

2 Attachments:

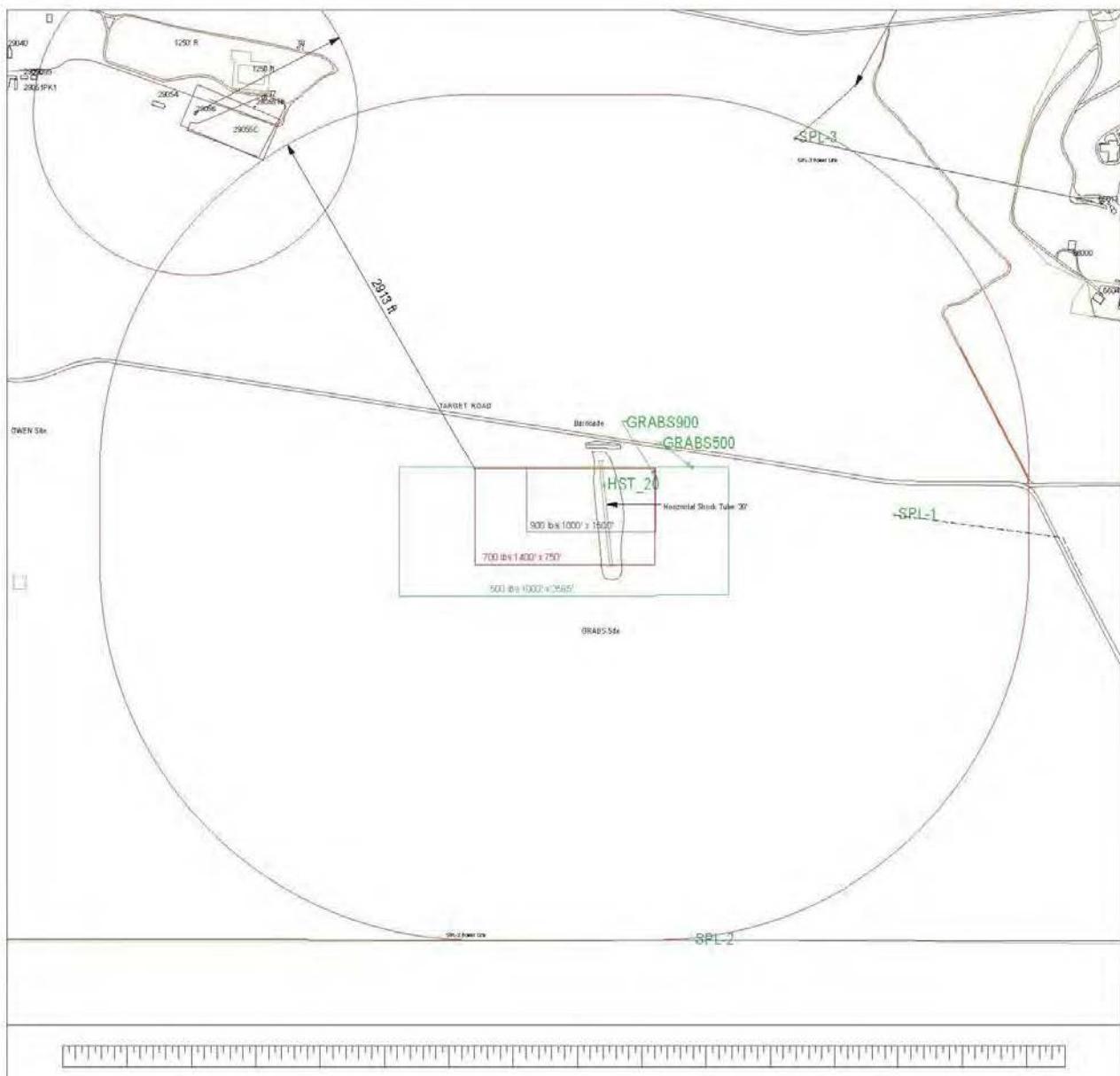
1. AFMC-Kirtland-10-S59 through 61,  
AF Forms 943s and Maps
2. AFMC Kirtland-93-S1 DDESB Approval Letter, 5 Jan 95
3. Site Location Map

EXPLOSIVES SITE PLAN									
SECTION I - GENERAL INFORMATION									
ACTION NUMBER AFMC-Kirtland 10-S59 w/Comp Measures			BASE/LOCATION Kirtland AFB, New Mexico			DATE Apr 19, 2010			
SECTION II - SITE DATA									
SITE INFORMATION									
FAC NO. <b>1</b>	FACILITY/OPERATION DESCRIPTION <b>2</b>	OWNING MAJCOM/UNIT <b>3</b>	NO. OF PEOPLE <b>4</b>	SITED NEWQD <b>5</b>	(xx) HC/D MCE/LSRN <b>6</b>	REMARKS <b>7</b>			
GRAB S500	Disposal Range, Fragmenting 500 POUND RANGE	DOD-DTRA	0M 0C 0FN	500 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4				
SECTION III - PES/ES Q-D PAIRED RELATIONSHIPS WITH FACILITY/LOCATION BEING SITED									
FAC NO. <b>1</b>	FACILITY/OPERATION DESCRIPTION <b>2</b>	OWNING MAJCOM/UNIT <b>3</b>	NO. OF PEOPLE <b>4</b>	SITED NEWQD <b>5</b>	(xx) HC/D MCE/LSRN <b>6</b>	DIST ACT <b>7</b>	DIST RQD <b>8</b>	SEP FACTOR Table/Parm <b>9</b>	REMARKS <b>10</b>
GRAB S700	Disposal Range, Fragmenting 700 POUND RANGE	DOD-DTRA	0M 0C 0FN	700 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	11' 0	2913' 0	<T12.In12V N/A	Will not be used concurrently with GRABS-500.
GRAB S900	Disposal Range, Fragmenting 900 POUND RANGE	DOD-DTRA	0M 0C 0FN	900 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	3' 0	3167' 0	<T12.In12V N/A	Will not be used concurrently with GRABS-500.
HST_2 0	Disposal Range, Fragmenting SHOCK TUBE, 20FT. DIAMETER	DOD-DTRA	0M 0C 0FN	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	0' 0	2604' 0	T12.In12V N/A	Will not be used concurrently with GRABS-700. Shock tube is not being used but was designed to contain repeated 900 lb blasts.
SPL-1	Abandoned Facility POWER LINE	DTRA-DTRA	0C 0M	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	1297' 0	50' 0	T12.In12 N/A	



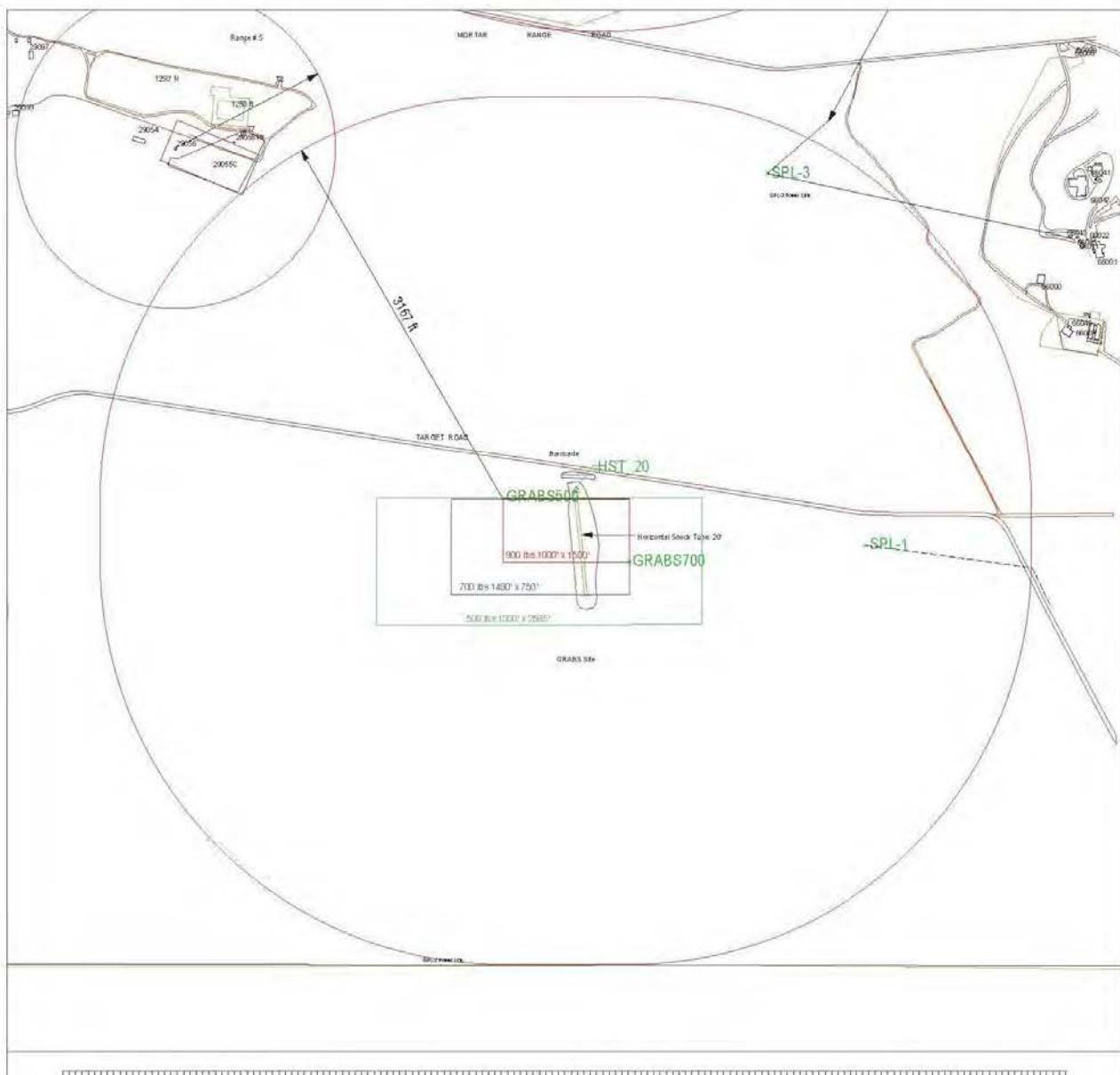
Title	Legend	NEW	HC/D
Explosives Site Plan	= PES	500	1.1
Kirtland AFB, New Mexico	= ES	None	1.2.1
AFMC-Kirtland 10-S59	N/A = Eval Zone <= IBD	None	1.2.2
500 POUND RANGE	= IBD Clear Zone	None	1.2.3
Facility # GRABS500		None	1.3
		None	1.4

EXPLOSIVES SITE PLAN									
SECTION I - GENERAL INFORMATION									
ACTION NUMBER AFMC-Kirtland 10-S60 w/Comp Measures			BASE/LOCATION Kirtland AFB, New Mexico				DATE Apr 19, 2010		
SECTION II - SITE DATA									
SITE INFORMATION									
FAC NO. <b>1</b>	FACILITY/OPERATION DESCRIPTION <b>2</b>	OWNING MAJCOM/UNIT <b>3</b>	NO. OF PEOPLE <b>4</b>	SITED NEWQD <b>5</b>	(xx) HC/D MCE/LSRN <b>6</b>	REMARKS <b>7</b>			
GRAB S700	Disposal Range, Fragmenting 700 POUND RANGE	DOD-DTRA	0M 0C 0FN	700 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4				
SECTION III - PES/ES Q-D PAIRED RELATIONSHIPS WITH FACILITY/LOCATION BEING SITED									
FAC NO. <b>1</b>	FACILITY/OPERATION DESCRIPTION <b>2</b>	OWNING MAJCOM/UNIT <b>3</b>	NO. OF PEOPLE <b>4</b>	SITED NEWQD <b>5</b>	(xx) HC/D MCE/LSRN <b>6</b>	DIST ACT <b>7</b>	DIST RQD <b>8</b>	SEP FACTOR Table/Parm <b>9</b>	REMARKS <b>10</b>
GRAB S500	Disposal Range, Fragmenting 500 POUND RANGE	DOD-DTRA	0M 0C 0FN	500 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	11' 0	2913' 0	>T12.In12V N/A	Will not be used concurrently with GRABS-700.
GRAB S900	Disposal Range, Fragmenting 900 POUND RANGE	DOD-DTRA	0M 0C 0FN	900 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	0' 3167'	3167' 0	<T12.In12V N/A	Will not be used concurrently with GRABS-700.
HST_2_0	Disposal Range, Fragmenting SHOCK TUBE, 20FT. DIAMETER	DOD-DTRA	0M 0C 0FN	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	0' 2913'	2913' 50'	T12.In12V N/A	Will not be used concurrently with GRABS-700. Shock tube is not being used but was designed to contain repeated 900 lb blasts.
SPL-1	Abandoned Facility POWER LINE	DTRA-DTRA	0C 0M	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	1872'	50'	T12.In12 N/A	
SPL-2	Public Traffic Route Electrical Line <69Kv, Abvgnd	AFMC-377 ABW	0C 0M	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	2913'	933'	T12.In12 N/A	
SPL-3	Public Traffic Route Electrical Line <69Kv, Abvgnd	AFMC-377 ABW	0C 0M	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	2793'	933'	T12.In12 N/A	



Title	Legend	NEW	HC/D
Explosives Site Plan	= PES	700	1.1
Kirtland AFB, New Mexico	= ES	None	1.2.1
AFMC-Kirtland 10-S60	= Eval Zone <= IBD	None	1.2.2
700 POUND RANGE	= IBD Clear Zone	None	1.2.3
Facility # GRABS700		None	1.3
		None	1.4

EXPLOSIVES SITE PLAN									
SECTION I - GENERAL INFORMATION									
ACTION NUMBER AFMC-Kirtland 10-S61w/Comp Measures			BASE/LOCATION Kirtland AFB, New Mexico			DATE Apr 19, 2010			
SECTION II - SITE DATA									
SITE INFORMATION									
FAC NO. <b>1</b>	FACILITY/OPERATION DESCRIPTION <b>2</b>	OWNING MAJCOM/UNIT <b>3</b>	NO. OF PEOPLE <b>4</b>	SITED NEWQD <b>5</b>	(xx) HC/D MCE/LSRN <b>6</b>	REMARKS <b>7</b>			
GRAB S900	Disposal Range, Fragmenting 900 POUND RANGE	DOD-DTRA	0M 0C 0FN	900 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4				
SECTION III - PES/ES Q-D PAIRED RELATIONSHIPS WITH FACILITY/LOCATION BEING SITED									
FAC NO. <b>1</b>	FACILITY/OPERATION DESCRIPTION <b>2</b>	OWNING MAJCOM/UNIT <b>3</b>	NO. OF PEOPLE <b>4</b>	SITED NEWQD <b>5</b>	(xx) HC/D MCE/LSRN <b>6</b>	DIST ACT <b>7</b>	DIST RQD <b>8</b>	SEP FACTOR Table/Parm <b>9</b>	REMARKS <b>10</b>
GRAB S500	Disposal Range, Fragmenting 500 POUND RANGE	DOD-DTRA	0M 0C 0FN	500 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	3' 0	3167' 0	>T12.In12V N/A	Will not be used concurrently with GRABS-900.
GRAB S700	Disposal Range, Fragmenting 700 POUND RANGE	DOD-DTRA	0M 0C 0FN	700 None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	0' 0	3167' 0	>T12.In12V N/A	Will not be used concurrently with GRABS-900.
HST_2_0	Disposal Range, Fragmenting SHOCK TUBE, 20FT. DIAMETER	DOD-DTRA	0M 0C 0FN	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	0' 0	3167' 0	T12.In12V N/A	Will not be used concurrently with GRABS-900. Shock tube is not being used but was designed to contain repeated 900 lb blasts.
SPL-1	Abandoned Facility POWER LINE	DTRA-DTRA	0C 0M	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	1868' 0	50' 0	T12.In12 N/A	
SPL-3	Public Traffic Route Electrical Line <69kV, Abvgnd	AFMC-377 ABW	0C 0M	None None None None None None	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	2783' 0	1014' 0	T12.In12 N/A	



Title	Legend	NEW	HC/D
Explosives Site Plan	= PES	900	1.1
Kirtland AFB, New Mexico	= ES	None	1.2.1
AFMC-Kirtland 10-S61	N/A = Eval Zone <= IBD	None	1.2.2
900 POUND RANGE	= IBD Clear Zone	None	1.2.3
Facility # GRABS900		None	1.3
		None	1.4



DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD  
2461 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22331-0600



DDESB-KO

05 JAN 1995

MEMORANDUM FOR HEADQUARTERS AIR FORCE SAFETY AGENCY  
(ATTENTION: SEW)

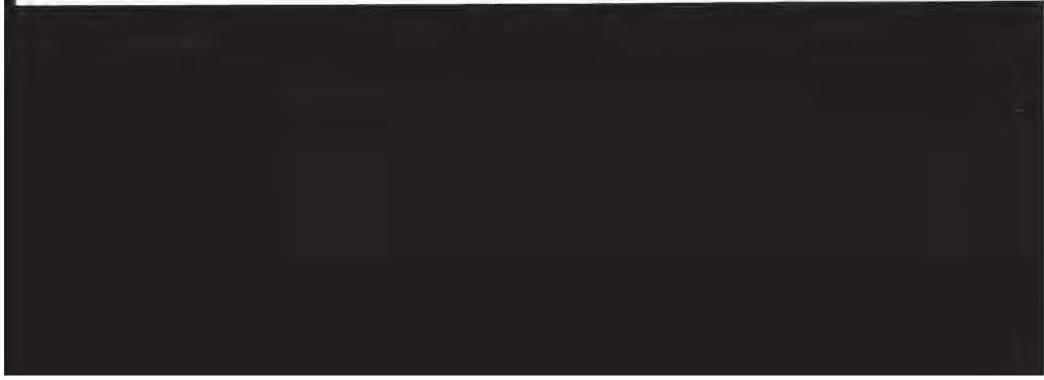
SUBJECT: Explosives Site Plan Request, GRABS Site, AFMC/DNA-Kirtland AFB-93-S1

Reference: HQ AFSA/SEW letter of November 16, 1994, Same subject

The subject site plan forwarded by the reference has been reviewed with respect to explosives safety criteria. Based on the information furnished, both the siting and final safety review for the test complex at Kirtland AFB, NM are approved. This approval is for the following test sites:

- a. Horizontal Shock Tube (HST-20) with a limit of 900 pounds of Hazard Division (HD) 1.1 explosives.
- b. Horizontal Shock Tube (HST-6) with a limit of 55 pounds of HD 1.1 explosives.
- c. Horizontal Shock Tube (HST-2) with a limit of 65 pounds of HD 1.1 explosives.
- d. Detonation Chamber (DET-1) with a limit of 50 pounds of HD 1.1 explosives.
- e. 500 Pound Test Site (TB-1) with a limit of 500 pounds of HD 1.1 explosives.
- f. Half Space (HS-1) with a limit of 1 pound of HD 1.1 explosive.
- g. Water Shock (WS-1) with a limit of 1 pound of HD 1.1 explosive.
- h. Giant Airblast Simulator (GRABS) with a limit of 592 pounds of HD 1.1 explosives.
- i. 1,000 Pound Test Site (TB-2) with a limit of 1,000 pounds of HD 1.1 explosives.
- j. Van Shelters 1 and 2.
- k. Gas Building (GB-1) with no explosives limit.

[Attachment 2]

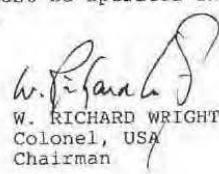


2

1. Horizontal Shock Tube (HST-7) with no explosives limit.

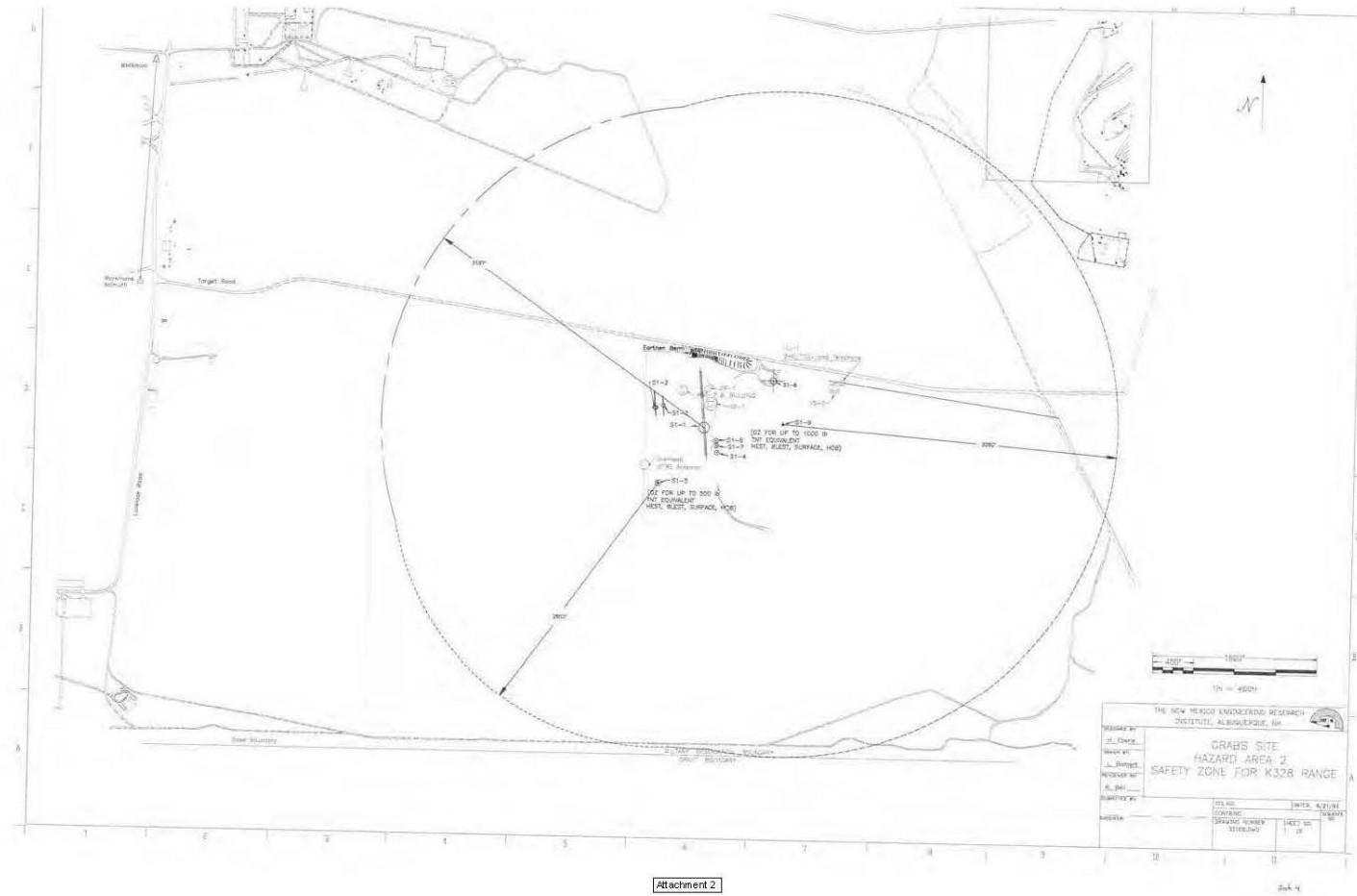
The approvals for these sites are based on the following:

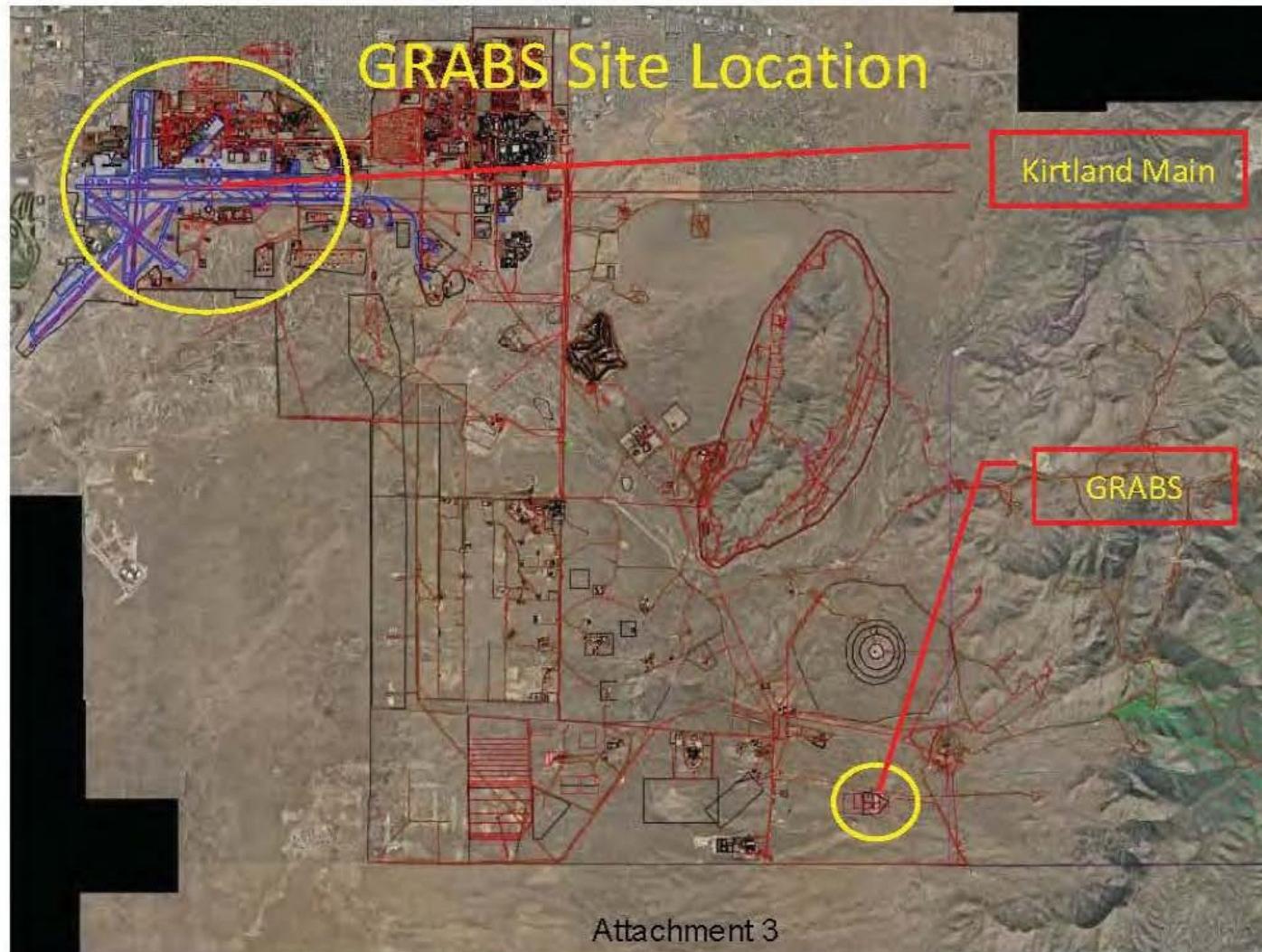
- a. Explosives will only be at one site at any one time and only one explosives operation/test will be performed at a time.
- b. The test sites must be operated in accordance with attachment 1 of the reference.

  
W. RICHARD WRIGHT  
Colonel, USA  
Chairman

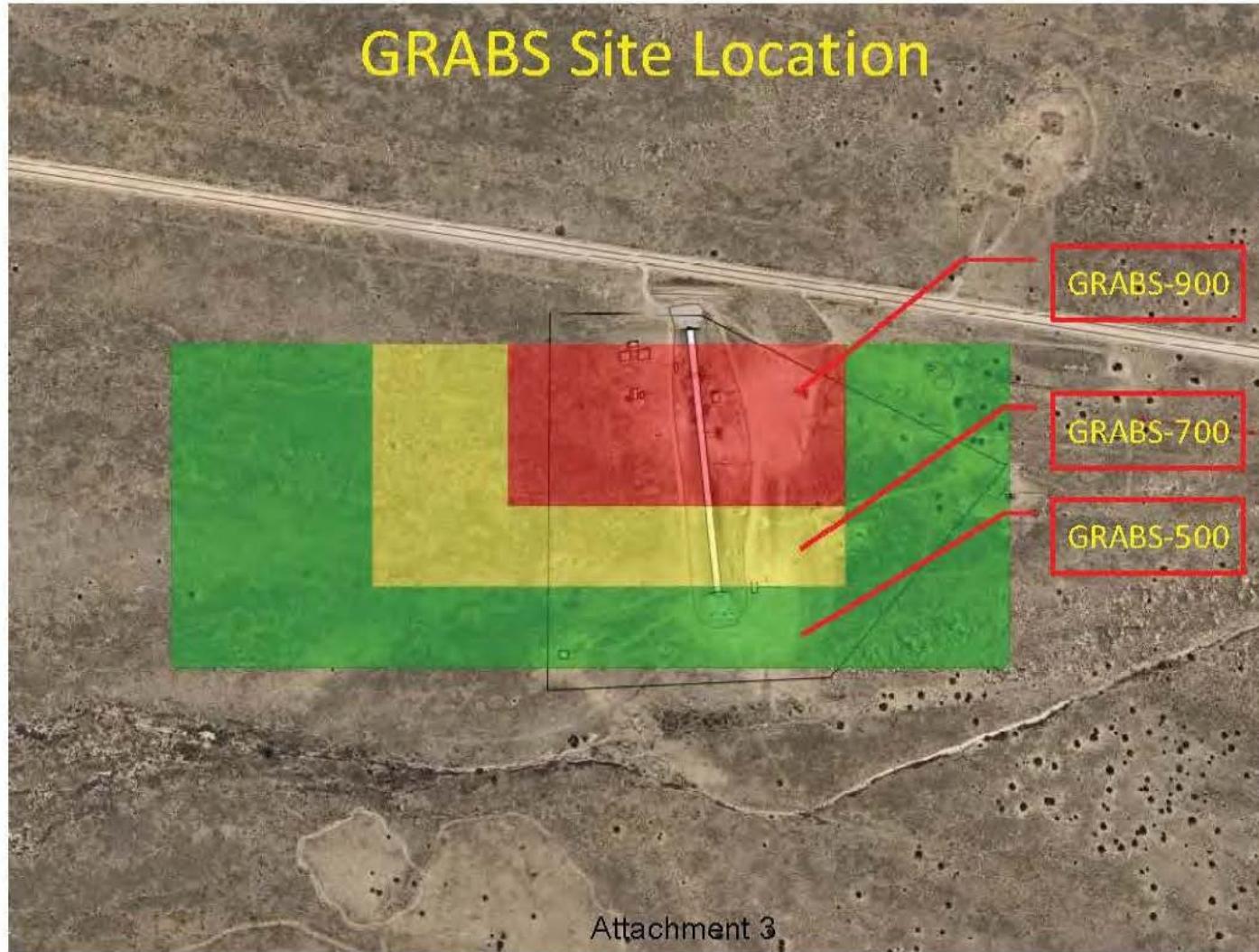
[Attachment 2]







Attachment 3



**Shock Physics Division**

**Approval Document  
DISTINCT FALCON PROOF OF CONCEPT (DF-POC)  
Explosive Operations  
Standing Operating Procedures (SOP)**

PREPARED BY:

Gregory M. Dutro  
Explosives Engineer, ARA/SPD

Date

REVIEWED:

John Hostak  
ARA/SPD Safety, Environmental, and Health Manager

Date

REVIEWED:

Lonnie Bamert  
Sr. Engineer, ARA/SPD/ESO

Date

APPROVED:

Robert Couch  
ARA/SPD Manager

Date

REVIEWED:

Roger D. Bevins  
DTRA/CXTS/SO

Date

REVIEWED:

AFRL/RDOT

Date

APPROVED:

377 ABW/SEW, Explosive Safety

Date

ARA-T3-SOP-5.06-36

Standing Operating Procedures

for

DISTINCT FALCON PROOF OF CONCEPT (DF-POC)

Explosive Operations

at

Chestnut Test Site, Kirtland AFB

Standing Operating Procedures (SOP) (CDRL 4)  
Test Operation and Test Technology Support (TOTTS)

Contract # DTRA02-03-D-0002-0048  
Shock Physics Technology

12 May 2010

Gregory M. Dutro  
Explosives Engineer

Prepared for  
Defense Threat Reduction Agency  
Technology Development Directorate-Test Division  
Building 20363  
1680 Texas St. SE  
Kirtland Air Force Base, NM 87117-5669

Distribution authorized to US Government Agencies and their contractors; Critical Technology, 6 June 2009. Other requests for this document shall be referred to Defense Threat Reduction Agency, Mail Stop 6201, 8725 John J. Kingman Road, Fort Belvoir, VA 22060-6201.

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**DISTINCT FALCON PROOF OF CONCEPT (DF-POC)**  
**Supervisor's Statement**

1. Supervisors will sign this statement:

    - a. When first assigned to the operation.
    - b. At least once per quarter during continuing operations, or at the completion of quarterly training.
    - c. When initial safety briefings are conducted to implement this SOP.
    - d. When approved formal or interim changes are made to the SOP and when subsequent safety briefings are provided.
    - e. After absence from the job in excess of 15 consecutive working days.
  2. I have personally reviewed each of the operational steps in this safety plan and have no question in my mind that the operation can be performed safely, efficiently, and in an environmentally acceptable manner. I have trained, or provided proper training to the operators in the details of their parts of the operation, and have instructed them to follow this safety plan without deviation. I have also presented or attended an initial safety briefing or subsequent safety briefings to compliment this safety plan and have documented by signing and dating in the columns below.

NAME (Print)

DATE

SIGNATURE

**DISTINCT FALCON PROOF OF CONCEPT (DF-POC)**  
**Operator's Statement**

1. Operators will sign this statement:
      - a. When first assigned to the operation.
      - b. At least once per quarter during continuing operations, or at the completion of quarterly training.
      - c. When initial safety briefings are conducted to implement this SOP.
      - d. When approved formal or interim changes are made to the SOP and when subsequent safety briefings are provided.
      - e. After absence from the job in excess of 15 consecutive working days
    2. I have read the general and specific safety requirements, work description, and inspection requirements necessary to safely accomplish my tasks for completion of this operation. When this safety plan is in conjunction with non-Explosive Operations, I will abide to the additional general and specific personnel safety limits related to that safety plan. I am trained and qualified to perform my duties detailed in this safety plan safely and without deviation. I thoroughly understand and agree to abide by this safety plan and ARA/SPD Safety Policy throughout my assignment to the operation. I have also attended an initial safety briefing or subsequent safety briefings to compliment this safety plan and have documented by signing and dating in the columns below.

NAME (Print)

DATE

SIGNATURE

DEFENSE THREAT REDUCTION AGENCY (DTRA)  
DISTINCT FALCON PROOF OF CONCEPT (DF-POC)  
Explosive Operations  
Standing Operating Procedures (SOP)

**Operations:** Transportation, emplacement, arming, and detonation of explosive charges.

**Areas:** The Chestnut Test Site located at Grid Coordinates 591683 on the Kirtland Air Force Base (KAFB) crash grid map, dated 1, October 2009. Figure 1 is a drawing of the Chestnut Test Site showing limited access hazard zones and road-blocks for the DF-POC test series.

**Explosive Limits:** The DF-POC series consists of three separate tests.

Test 1 is a Fluid Discharge Device (FDD) consisting of five 1 pound Comp C-4 explosive charges (6.9 pounds TNT equivalent) (Hazard Class/Div 1.1D). The charges will be detonated simultaneously using up to five RP-83 Exploding Bridge Wire (EBW) detonators with each containing less than 0.01 pounds of PETN and RDX (Hazard Class/Div 1.4).

Test 2 is an ANFO Charge Container consisting of up to 62.5 lbs of Ammonium Nitrate and Fuel Oil (ANFO) (51.9 pounds TNT equivalent)(Hazard Class/Div 1.1D), and a 2 pound Comp C-4 booster (2.8 pounds TNT equivalent) (Hazard Class/Div 1.1D). The Comp C-4 charge will be detonated using one RP-83 EPW detonator containing less than 0.01 pounds of PETN and RDX (Hazard Class/Div 1.4).

Test 3 is a Particle Discharge Device (PDD) consisting of a 3 pound Comp C-4 explosive charge (4.2 pounds TNT Equivalent)(Hazard Class/Div 1.1D) and an ANFO Charge Container consisting of up to 62.5 lbs of ANFO (51.9 pounds TNT equivalent)(Hazard Class/Div 1.1D), and a 2 pound Comp C-4 booster (2.8 pounds TNT equivalent) (Hazard Class/Div 1.1D). Each Comp C-4 charge will be detonated using one RP-83 EPW detonator containing less than 0.01 pounds of PETN and RDX (Hazard Class/Div 1.4).

**Personnel Limits:** 8 Operators: 4 Test Support Personnel: 4

1. **Purpose.** The purpose of this SOP is to provide clear and concise guidance for operator and supervisory personnel conducting explosive operations.

2. **Scope.**

a. This plan prescribes the safety policies and procedures for the transportation and handling of explosives for the DF-POC test series which will be conducted at the Chestnut Test Site. Applied Research Associates, Inc. (ARA) personnel will provide the explosive support. This plan also documents hazards for other participating organizations.

b. This SOP applies to all personnel performing any operation noted herein. An initial safety briefing will be conducted to implement this SOP. Subsequent safety briefings will occur and will be documented, as the situation requires. Personnel performing or supervising any part of this operation will be thoroughly familiar with the provisions of this SOP and will sign the appropriate SOP supervisor's or operator's statement (attached).

3. **Policy.** Compliance with the ARA/SPD Safety and Health Plan, DTRA TOTTS Contract safety requirements, and other applicable directives from higher headquarters is required when performing operations covered by this SOP. See Annex A.

a. ANY test team member can call a safety-required work stoppage at any point in fielding or execution of a test. It is the responsibility of ALL test team members to notify their supervisor of any unsafe condition or act. ARA personnel shall notify the following: ARA Explosives Safety Officer (ESO) or ARA Alternate Explosives Safety Officer (AESO) for all explosive related safety requirements, ARA Safety, Environmental and Health Manager (SEHM) and ARA Site Safety Officer (SSO) for all non-explosive related safety requirements, DTRA/CXTFS/TGD Test Fielding Branch Fielding Support Section (FS) /Test Group Director (TGD), and the

DTRA/CXTS/SO Safety and Occupational Health Specialist Safety Officer (SO) for all safety-required work stoppage and immediate safety concerns.

b. The DTRA/CXTS/SO, DTRA/CXTFS/TGD, ARA/ESO or ARA/AESO, ARA/SSO and ARA/SEHM shall ensure work is stopped and confer to recommend the safest feasible solution. Safety concerns with initially identified risk for serious injury, illness, or death require immediate abatement. The ARA/SPD Manager, and others, as required by DTRA, must approve recommended corrective measures.

c. In the event of a conflict between the ARA/SPD Safety and Health Plan and any other directive, the most stringent requirement will take precedence. The only exception will be when a hazard analysis shows the more stringent requirement leads to an unacceptable risk in a related activity.

d. The ARA/ESO or ARA/AESO, will document all approved changes in this SOP, and all personnel approving or performing any operation noted herein will sign and date the approved changes.

e. Changes that do not initially pose potential for serious injury, illness, or death may be effected by the field operating level supervisors (DTRA/CXTS/SO, ARA/ESO or ARA/AESO, and ARA/SEHM). Field operating level supervisors will incorporate these changes or procedures into the SOP and brief all applicable SOP participants who will initial their concurrence and acceptance of the procedures.

f. All changes or modifications to this SOP will be added to the official ARA contract file.

g. ARA subcontractors will be notified that it is mandatory for them to read, understand, and comply with this SOP.

#### 4. Description of Operations.

a. The DF-POC test series is designed to demonstrate the capability of explosively disseminating a volume of fluids and fine particles. Test 1 evaluates the height fluid is discharged from a FDD. Test 2 evaluates the fireball height and duration from an ANFO charge container. Test 3 evaluates the height fine particles are discharged from a PDD. Explosive operations for the first test will consist of placing Comp C-4 charges into the bottom of the FDD and detonating. A depiction of the FDD is provided in Figure 2. Explosive operations for the third test will similarly consist of placing Comp C-4 charges into the bottom of the PDD and detonating. A depiction of the PDD is provided in Figure 3.

b. Explosive operations for each test will consist of the transportation, emplacement, arming and firing of Comp C-4 and ANFO explosive charges. The charges, boosters, and detonators will be loaded into an ARA explosives transportation vehicle at the storage igloos and transported to the site.

c. Prior to Test 1, an FDD steel cylinder with water will be positioned on top of an 8-ft tall charge stand. Prior to Test 3 a PDD steel cylinder with fine particles will be positioned on top of an 8-ft tall charge stand. The charge stands will consist of a 0.75-in plywood top fastened to 4-in by 4-in posts with 2-in by 4-in cross bracing (Figure 2). The tables will be weight tested to two times the gross expected weight. The explosive charge will be installed through an access door located at the side of the FDD (Figure 2), similarly for the PDD (Figure 3). A step ladder supported by ARA personnel will be required to install the Comp C-4 charge into the FDD and PDD.

d. For Test 1, five each 1-lb Comp C-4 charges will be positioned in a circle inside the bottom of the FDD. Four RP-83 EBW detonators will be connected in series and inserted into their corresponding charges. For Test 3, a 3-lb Comp C-4 charge will be positioned inside the bottom of the PDD. One RP-83 detonator will be inserted into the Comp C-4 charge.

e. For Test 2 and 3, a 1-ft diameter cardboard Sono tube will be arranged on top of a 2ft high concrete block. The ANFO charge will be placed inside the Sono tube. A Comp C-4 booster with EBW detonator will be placed in the center of the ANFO charge. A depiction of an ANFO charge and booster is provided in Figure 5.

f. For all tests the firing cable will be attached to the X-Unit. The arming personnel will evacuate to designated road blocks and to the timing and firing location designated in Figure 1.

g. After receiving permission from the DTRA/CXTS/SO, the charge will be remotely detonated using a high voltage firing system consisting of an X-unit and control panel.

5. **Safety.** The requirements listed below are mandatory for all operations covered by this SOP.

a. The DF-POC test series Workplace Hazard Analysis was performed by the ARA/ESO (Annex B). The Workplace Hazard Assessment Personal Protective Equipment (PPE) Certification lists the required PPE for personnel working with explosives (see Annex C).

b. Safety briefings will be held before conducting any hazardous operation to discuss safety procedures involved with the task.

c. A description of the test site and associated ground safety hazards are described in the ARA/SPD, Safety and Health Plan.

d. All explosives will be transported and handled in accordance with current Federal, State, Department of Defense, and KAFB regulations. All explosives will be packaged and transported in accordance with 49 CFR 173.

e. Vehicles used for the transportation of explosives will be inspected and certified in accordance with AFM 91-201. Vehicles will be appropriately equipped with explosive signs and two portable fire extinguishers class 2A:10BC or greater.

f. Only the quantity of explosives necessary for the test will be transported to the test bed.

g. The DTRA/CXTS/SO will notify ARA ordnance personnel when to commence explosive operations. ARA ordnance personnel will notify the DTRA/CXTS/SO when explosive operations are complete.

**NOTE:**

**DTRA/CXTS/SO will establish the personnel control plan and hazard zones applicable for explosive operations (see Figure 1 and Annex D). Before explosive operations begin, the hazard zones will be cleared of all personnel, as required. ARA will provide on-site security and control access to explosives.**

h. At least two experienced people (two-person rule) will be in the vicinity when explosive work is being performed. Non-essential personnel will be cleared to the observation location, beyond the LAZ, while explosive operations are being conducted (Figure 1). All personnel will check in and out at the established roadblocks in accordance with the countdown procedures.

i. Smoking or flame producing devices are not permitted within 100 feet of any explosive or explosive residue.

j. Only high-energy EBW detonators will be used for these tests (ARA).

k. Only authorized personnel will be in the Timing and Firing (T&F) Van during the detonation (DTRA/ARA).

l. A ground fault circuit interrupter (GFCI) system will be utilized on all portable electric tools.

m. The hazard zones for these tests are based on blast overpressure and fragment hazards. For calculating fragment hazards, the FDD and PDD steel cylinder were considered to be "non-robust casing" as defined by the AFM 91-201, Explosives Safety Standards as an additional precaution. For additional safety the overpressure hazard zone was based on 62 pounds of TNT equivalent explosives. This is calculated by adding 3-lbs Comp C-4 in the FDD, 62.5-lbs ANFO and 2-lbs Comp C-4 booster inside the ANFO to get 58.7-lbs TNT equivalent. An additional 3.3-lbs TNT was added to the overall calculation to allow for slight increases of explosive weight during the fabrication of the charges.

n. During the test only those personnel that are essential to the test are allowed inside the Instrumentation Van (I-Van). The I-Van is located within the Limited Access Zone (LAZ) but outside the K328 safety zone as seen in Figure 1. The I-Van provides protection from the debris for the personnel and equipment that are essential for the test. Hearing protection is not required for personnel located outside the K328 safety zone. All other personnel will be evacuated outside the LAZ.

o. A step ladder supported by ARA personnel will be used to access the FDD and PDD doors and install the explosive charges. A depiction of the FDD charge setup is provided in Figure 4. The PDD charge setup is similar. The wood tables will be weight tested to twice the heaviest load which is the FDD. The FDD weighs 1863 pounds (973 pounds steel and 890 pounds of water).

p. During extreme fire conditions, the fire prevention and fire protection procedures in the Operational Risk Management for Fire Prevention – Fire Protection, dated 29 March 2009 will be followed (ARA).

6. **Lightning and Electrostatic Hazard Warning System.** A portable lightning/storm detector will be used to detect storm activity occurring within 40 miles of the test site. An audible warning tone and flashing lights will notify personnel of storm activity. ARA personnel will also monitor storm activity at the T&F van through an internet connection and notify personnel of impending lightning activity. If lightning storm activity is detected within 6 miles of the test site, explosive operations will cease and the area will be evacuated. Personnel assigned to monitor the lightning/storm detector will advise the DTRA/CXTS/SO or the DTRA/CXTFS/TGD to evacuate the test bed. The safe evacuation areas will be the roadblocks locations highlighted in Figure 1.

## 7. Procedures.

### a. General.

1) ARA personnel will deliver and install the stands and FDD or PDD at the test site using certified equipment (fork lift, crane, and boom truck) and qualified operators. For Test 1, the stand will be erected, the steel FDD will be put in position, and the upper reservoir will be filled with water. For Test 2 and 3, the ANFO charge container will be positioned on top of the concrete base. For Test 3, the stand will be erected, the steel PDD will be put in position, and the upper reservoir will be filled with fine particulates.

2) The DTRA/CXTS/SO will ensure that roadblocks are in position before starting explosive operations.

3) Radios will not be used within 25-ft of the explosives.

4) Detonator firing lines will be kept shorted, except during required operations described in the paragraphs below.

4) Use of AC power tools will not be conducted inside the CAZ.

### b. Countdown Sequence.

1) A dry run of the firing system will be conducted before explosive operations begin.

2) The countdown sequence will be established by DTRA in consultation with the ARA/ESO.

### c. Charge Delivery/Preparation.

1) Only personnel listed in paragraph 10.a of this SOP will move explosives. The explosive transport vehicle will be kept at least 100 feet from GZ until explosive operations begin. All tripping and fire hazards will be removed from the loading and unloading sites prior to moving the explosives.

2) Unauthorized personnel will be kept clear of the CAZ during and after placement of the explosives (DTRA/CXTS/SO).

### d. Charge Placement.

- 1) Permission to commence charge placement operations will be given by the DTRA/CXTS/SO with concurrence from the ARA/ESO.
- 2) For Test 1, the five Comp C-4 explosive charges will be removed from the transport vehicle and carried by hand to the test site Ground Zero (GZ). They will be carefully inserted through the door of the FDD and placed on the bottom of the FDD container.
- 3) For Test 2 and 3, the ANFO will arrive on a DOT approved vehicle inside 50-pound bags. ARA personnel listed in paragraph 10.a and 10.b will remove bags from the vehicle and pour half of the ANFO charge directly into the Sono tube container.
- 4) For Test 3, the Comp C-4 charge will be removed from the transport vehicle and carried by hand to the test site GZ. It will be carefully inserted through the door of the PDD and placed at the center of the FDD container.

**NOTE:**

A shorting plug, P/N 188-3554 will be used to short the detonator cable, Reynolds Type C P/N 167-1617, except during continuity checks and arming procedures (ARA).

**WARNING!**

DTRA/CXTS/SO and the ARA/ESO or ARA/AESO will ensure all radios and cell phones within 25 feet of GZ are turned off during the detonator placement operations.

**WARNING!**

Wear safety glasses while handling the detonator. The test bed will be clear of all unnecessary personnel during this operation (ARA/DTRA).

**WARNING!**

Exercise care not to walk, damage, or step on the detonator cable.

- 5) To install the detonators for each test, explosive trained ARA personnel, listed in paragraph 10.a, will carry the required number of detonators from the transport vehicle to GZ, remove them from their shipping containers and visually inspect them for physical damage. The two wire leads from each detonator will be connected to its designated detonator cable by twisting the wire leads of the detonator to the wire leads of the detonator cable. The connections will be insulated with electrical tape. The shorting plugs will be removed from the detonator cables and the resistance of the cable and detonator and the continuity of the connections will be checked using a galvanometer, or equivalent. If continuity is not confirmed, all connections will be checked and the tests will be repeated. The shorting plugs will be replaced on the detonators cables after a good connection has been obtained.

- 6) For Test 1, each of the five detonators will be connected in series and continuity of the connections will be checked using a galvanometer, or equivalent. The detonators will be hand carried up the step ladder and inserted directly into their corresponding Comp C-4 charges inside the FDD via the access hatch. The firing cables will egress through a hole drilled into the side of the FDD container and the access hatch will be closed.

- 7) For Test 2 and 3, the detonator will be inserted directly into the Comp C-4 booster. A non sparking tool will be used to form holes in the Comp C-4 booster. The wire leads from the detonator will be taped to the booster to ensure the detonator does not move. The booster with detonators and detonating cord will be placed on the top of the ANFO at the center of the Sono tube container. The firing cables and detonating cord will be taped to the side of the Sono tube container. The other end of the firing cable will be placed near the container, out of the way of all activities. The remaining ANFO will then be placed inside the charge container.

- 8) For Test 3, the detonator will be hand carried up the step ladder and inserted directly into the Comp C-4 charge inside the PDD via the access hatch. The firing cables will egress through a hole drilled into the side of the PDD container and the access hatch will be closed.

**E Arming (ARA).**

- 1) The ARA/ESO or ARA/AESO will check the firing system control units inside the T&F Van to ensure the system is safe. All lights on the firing unit must be off, the enable keys (power switch) must be in the off position, and all meters must read zero. The firing system control unit keys will be removed from the firing system and will be in the possession of the ARA/ESO or ARA/AESO.
- 2) All personnel not essential to arming the charge will evacuate to the observation locations.
- 3) ARA personnel will extend the firing cables from the source room to the X-unit.
- 4) DTRA/CXTS/SO will give permission to arm the charge.

**WARNING!**

**An inspection of the test bed will be conducted to verify all unauthorized personnel are out of the area prior to arming the explosives.**

- 5) ARA ordnance personnel will remove the shorting plugs from the ends of the firing cables and connect the firing cables to the X-unit and evacuate to the T&F van and respective road block position.

**g. Firing**

- 1) ARA ordnance personnel will remain at the T&F van to operate the firing system control panel.

**WARNING!**

**A final inspection of the test bed will be conducted to verify all personnel are out of the area.**

- 2) ARA ordnance personnel will verify with the DTRA/CXTS/SO that the test is on schedule and all personnel are clear of the area.
- 3) The ARA firing panel operator will ready the firing panel when verification is received from the DTRA/CXTS/SO.
- 4) The firing panel will be armed and fired as specified in the countdown sequence. In the event of a misfire, go to the misfire procedures found in Paragraph 7i.

**h. Hold Procedures.** In the event of a hold, a hold announcement will be made over the radio net. All personnel will remain at their positions.

- 1) The firing control panel will be safed by placing all switches in the off position and removing the firing keys.

**NOTE:**

**If the X-unit was charged, safe the firing system per misfire procedures in paragraph 7.i. If the cause of the hold can be corrected without re-entering the test bed, then the test can be re-started at a point in the timeline as determined by the DTRA/CXTS/SO.**

- 2) Re-entry of personnel to correct the hold problem will be authorized by the DTRA/CXTS/SO.
- 3) The arming party will remove the keys from the firing control panel and re-enter the area.
- 4) The detonator cable will be disconnected from the X-unit and the shorting plug will be installed.
- 5) After the problem has been corrected, the cable will be re-connected to the X-unit. The arming party will clear the area to re-start the test at a point determined by the DTRA/CXTS/SO.

**WARNING!**

**In the event of a misfire, perform the misfire procedures in paragraph 7.i.**

- i. **Misfire.** In the event of a misfire, the following steps will be performed.
  - 1) A misfire announcement will be made over the radio net. All personnel will remain at their position.
  - 2) The X-unit will be safed by performing the following.
    - a) Turn off fire control panel power switches.
    - b) Remove the keys.

**NOTE:**

**The High Voltage Monitor meter reading should decrease to zero when the power is turned off. (An internal bleed circuit in the X-unit removes the high voltage charge on the X-unit's capacitor rendering the system safe.)**

- 3) If voltage remains on a meter, verify voltage/no voltage on the X-unit capacitor by disconnecting and shorting the firing cable and use a VOM on the X-unit to read the voltage on charge lines one and two.

**NOTE:**

**All lights on the control panel must be off and the enable key switches (power switch) must be off and all meters read zero. Keys will be in the possession of the ARA/ESO or ARA/AESO.**

**NOTE:**

**If the firing system did not discharge the energy stored in the X-unit when the firing signal was sent, as indicated by no movement of the High Voltage Monitor Meter, the arming party consisting of the DTRA/CXTS/SO, ARA/ESO or ARA/AESO, and one ARA ordnance technician will proceed to GZ after the control panel have been safed per Paragraph 7.i.2.**

**WARNING!**

**If a discharge occurred on the control panel, as indicated by the change of voltage on the monitor meter, safe the firing panel, as described in Paragraph 7.i.2, and then wait a of 30 minutes before re-entering the test bed area.**

- 4) After the cause of the misfire has been determined and corrected, the test can be restarted at a point in the countdown sequence determined by the DTRA/CXTS/SO.

j. **Post Test.**

- 1) After detonation of the charge, the firing system will be safed by the control panel operator by removing the keys.
- 2) The reentry team (minimum - 2, maximum - 5) will reassemble at the I-Van and proceed to GZ to inspect the area for explosives (DTRA/ARA).
- 3) ARA Ordnance and DTRA Safety personnel will verify all explosives were expended and that there are no explosive hazards at the test bed.
- 4) When the area is determined to be clear of explosives, the DTRA/CXTS/SO will make a notification that the test bed is safe for general reentry as necessary.
- 5) Roadblocks will be released as appropriate (DTRA).

8. **Equipment Requirements.**

- a. TC-130 firing system.
- b. Firing cables, shorting plugs, explosive charges, boosters and detonators.

- c. Blaster's galvanometer, ANFO and Comp C-4 explosive charges.
- d. Vehicles equipped with fire extinguishers, explosive signs, and fire symbols as required for the operation.
- e. Required hand tools (non-sparking) and gaffers or duct tape.
- f. Approved VOM (volt/ohm meter).
- g. ANSI approved safety glasses, hard-hats, gloves, disposable rubber gloves and safety shoes (Annex C).
- h. Lightning/Storm warning systems (Sky Scan or Elk III).
- i. Charge containers and approved step ladder.

**9. Disposition of Components and Materials.** Any explosive residue found after detonation will be turned in to EOD for disposition.

**10. Authorized Personnel.**

a. Only the following people are authorized to handle explosives as required in the preceding sections of this SOP:

Lonnie Bamert, ARA/ESO  
Jeffery Heyborne, ARA/AESO

James Jaramillo, ARA

b. The following ARA personnel are authorized to handle explosives under the direct supervision of the above personnel as explosive handlers:

Louis Arbuckle, ARA  
Kevin Fulton, ARA

Greg Dutro, ARA  
Blair Walton, ARA

c. The following DTRA AFRL/ABW/AFSC personnel are authorized for explosives observation:

Ray Rieker, 377 Weapons Safety  
Tony Santino, AFRL/RDOT  
Greg King, DTRA/CXTTC/TS  
Roger Bevins, DTRA/CXTS/SO

Dennis Mulnix, DTRA/CXTS/SO  
David Crutchfield, 377 ABW Safety  
CPT Barton Jennings, DTRA/CXTF/TGD  
LCDR/O-4/USN David Blauser, DTRA/CXTS/SO

d. Other persons may be authorized to be at the test site by the DTRA/CXTS/SO with concurrence of the ARA/ESO or his representative.

**11. Emergency Action Procedures.**

a. Assess and stabilize the situation.

b. Get help. Primary contact is the ARA office, Building 20749 (first) via the information listed below.

Emergency	Cellular phone	853-9111	At Other times 911
Primary contact	All phones	846-0487	Radio Channel B-3

c. Report the mishap. Use ARA/SP Safety and Health Plan Section 11 Appendix K (maintained inside the Ordnance Vehicle). Record all information for investigation purposes as soon as possible.

d. Additional Numbers. The following is a list of phone numbers for various personnel directly involved with the test.

Lonnie Bamert, ARA/ESO	846-1704	Cell phone 401-2950
Jeffery Heyborne , ARA/AESO	853-6749	Cell phone 238-3485
James Jaramillo , ARA/AESO	846-6424	Cell phone 401-4633

- e. The official entry location to the test site is KAFB on-base crash grid map coordinates: 59.1, 68.3.
- f. Additional emergency telephone numbers and the mishap-reporting checklist are listed in the ARA Health and Safety Plan Section II Appendix K, and a copy of the telephone numbers will be maintained in the ordnance vehicle.

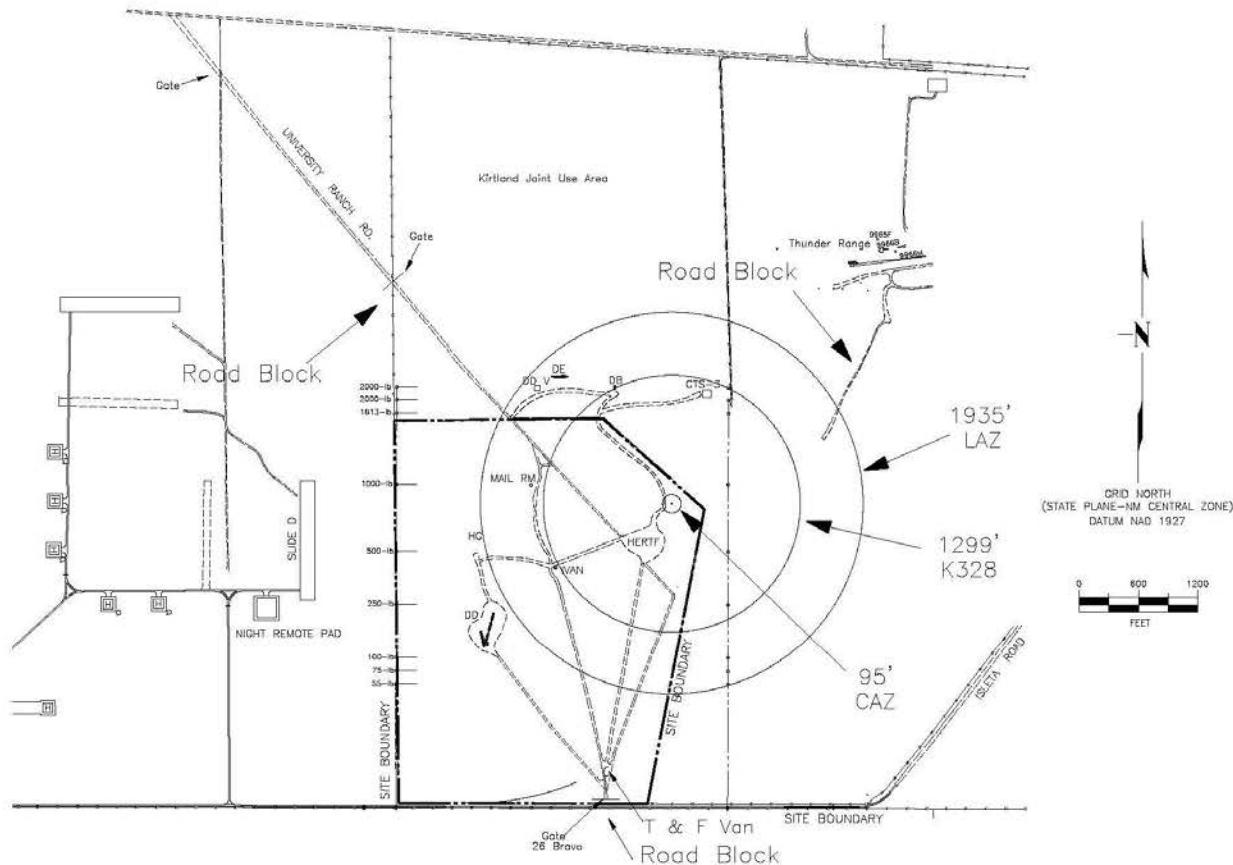


Figure 1. Chestnut Test Site showing explosive hazard zones and roadblocks.

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Original: 12 May 2010

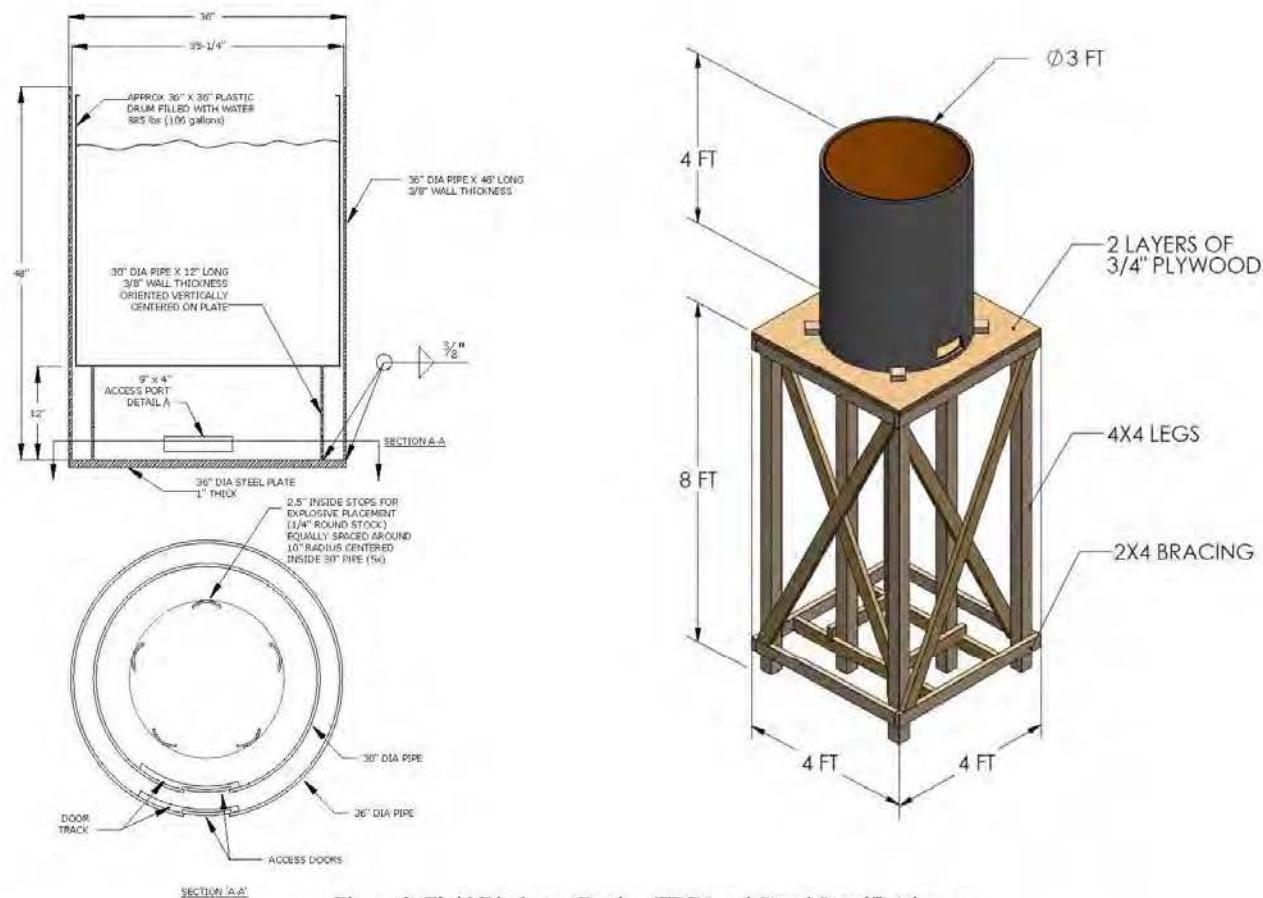


Figure 2. Fluid Discharge Device (FDD) and Stand Specifications

Original: 12 May 2010

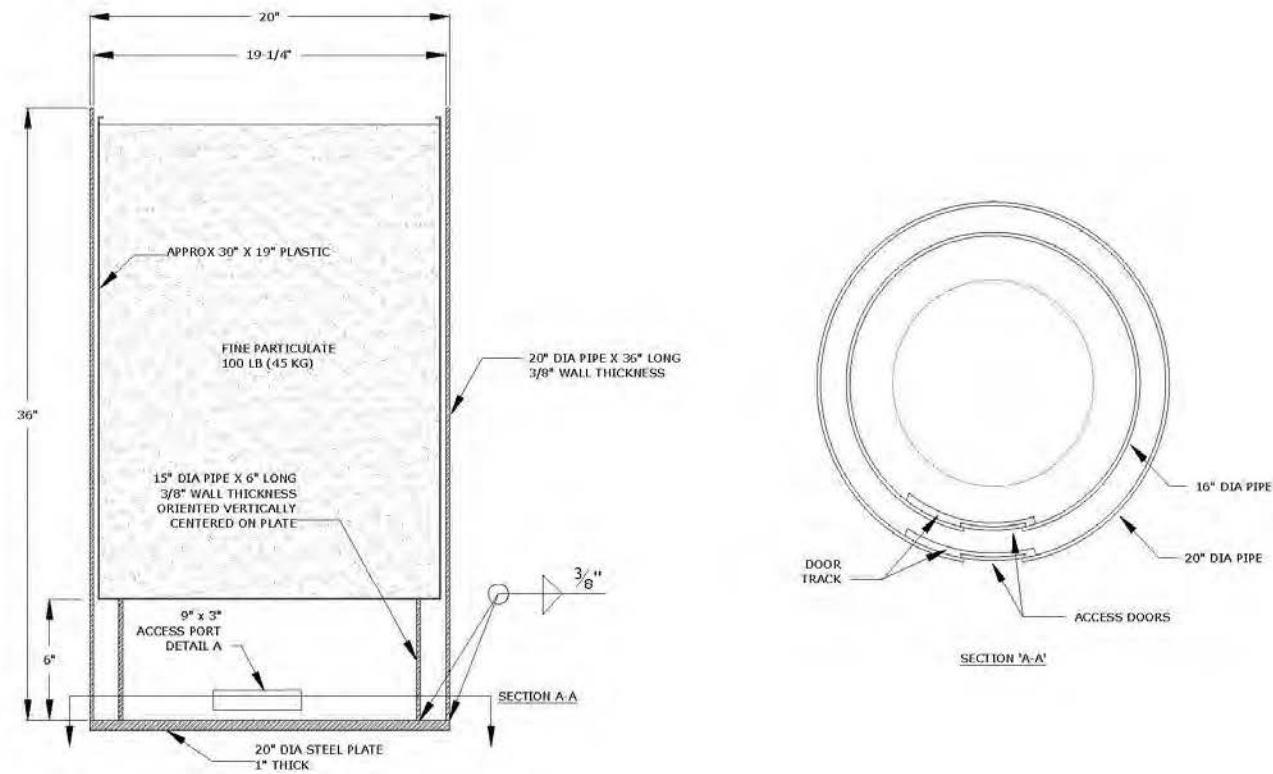


Figure 3. Particle Discharge device (FDD) Specifications

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Original: 12 May 2010

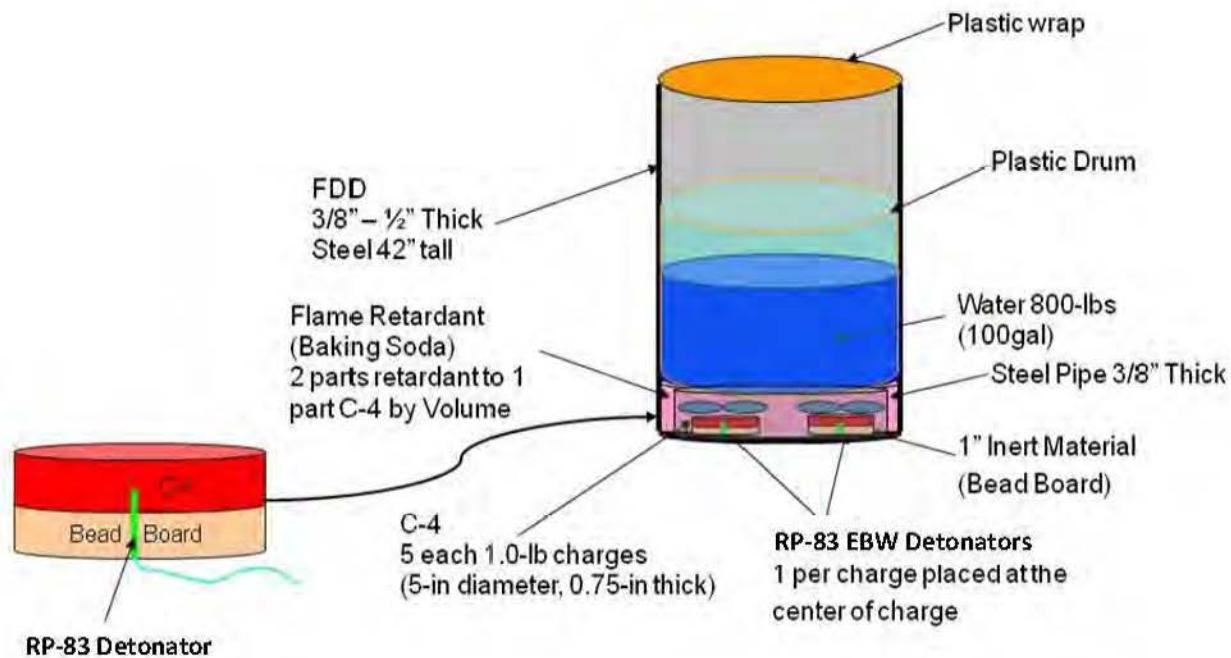


Figure 4. Fluid Discharge device (FDD) charge setup

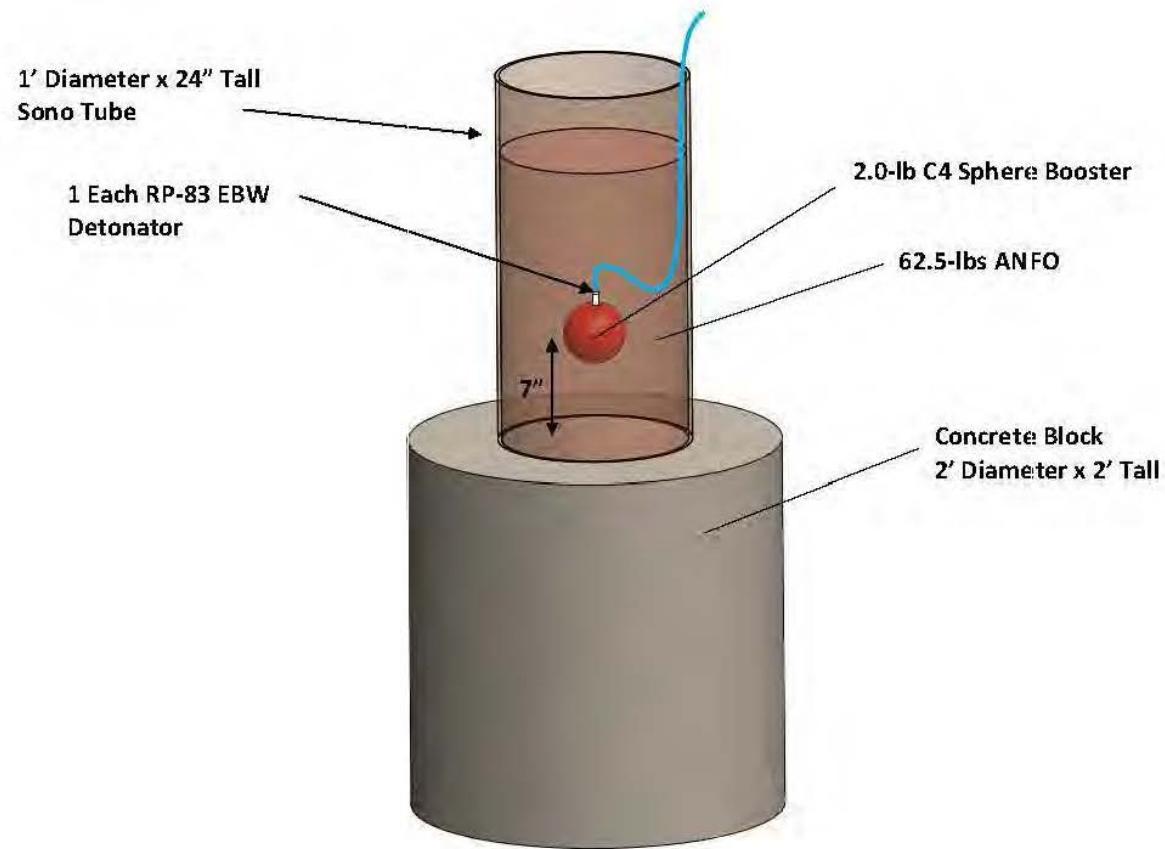


Figure 5. ANFO charge setup

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## ANNEX A: REFERENCE DOCUMENTS

KAFBI 91-201, Transportation Procedures for Hazardous Material, Radioactive Materials and Explosives, 01 Jan 2010

KAFBI 91-203, Controlled Firing Areas Coordinating Committee, 1 December 2005

KAFBI 91-207, Operational Risk Management, 13 June 2001

KAFBI 32-7002, Solid Waste Management, 30 October 1997

KAFBI 32-2002, Base Fire Protection Program, 1 December 2000

AFM 91-201, Explosives Safety Standards, 17 November 2008

AFOSII Standard 91-501, Air Force Consolidated Occupational Safety Standard

AFI 90-901, Operational Risk Management, 1 April 2000

KAFI 31-101, The Air Force Installation Security Program, 1 April 2001

AFPAM 90-902, Operation Risk Management (ORM) Guidelines and Tools, 14 December 2003

DOD Directive 6055.9-STD, DoD Ammunition and Explosives Safety Standards, February 29, 2008

DOD Directive 4145.26M, Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008

DOD Manual 5100.76M, Physical Security of Ammunition and Explosives, 12 August 2000

29 CFR Parts 1904, 1910, and 1926, Department of Labor, Occupational Safety and Health Administration

49 CFR Part 173, Department of Transportation.

ARA/SPD, Safety and Health Plan, 2 November 1999

ARA/SPD, Operational Risk Management for Fire Prevention-Fire Protection, 29 March 2007

AFWL-TR-73-198, High-Explosive Firing System, October 1972

**ANNEX B: SOP HAZARD ANALYSIS**  
(AFPAM 90-902)

DISTINCT FALCON PROOF OF CONCEPT

May 2010

Operation /Equipment	Hazard Potential Energy	Cause Stimuli	Effect Mishap Results	RAC Sev. x Prob.	Countermeasures Hazard Controls	RAC Controlled/ Eliminated
Loading, transporting and unloading vehicle/charges and detonators.	Fire/low order explosive event.	Brake/engine.	Injury to personnel and damage to equipment.	Medium (IxD)	Limit personnel in area. Prior check of equipment. Fire extinguishers readily available.	Low (IxI)
Installing charges inside FDD vessel	Explosive event.	Stand collapsing and falling on charge.	Death or serious injury to personnel.	High (IxI)	Limit personnel in area. Follow explosive SOP. Use weight tested stand.	Medium (IxI)
Attaching detonators to firing cable.	Fire/Explosive event	Voltage on firing lines.	Death or serious injury to personnel.	High (IxI)	Limit personnel in area. Use shorted firing cables. Wear safety glasses.	Medium (IxI)
Inserting detonators into explosive charges.	Explosive event.	Dropping explosives; impact, spark, fire, stray current.	Death or serious injury to personnel.	High (IxI)	Limit personnel in area. Maintain positive control of detonators and explosives.	Medium (IxI)
Explosive placement.	Explosive event.	Lightning strike.	Death or serious injury to personnel or damage to equipment.	High (IxI)	Use Lightning Warning System; Evacuate/cease operations when lightning is detected within 6 miles.	Medium (IxI)
Handling Comp C-4	Explosive contamination.	Contact with explosive.	Illness to personnel.	Medium (IxI)	Only essential personnel in area. Wear rubber gloves when handling explosives or wash hands after handling.	Low (IxI)

Certified by: \_\_\_\_\_

Date: \_\_\_\_\_

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**ANNEX B. SOP HAZARD ANALYSIS**  
(AFPAM 90-902)

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Operation/Equipment	Hazard Potential Energy	Cause Stimuli	Effect Mishap Results	RAC Sev x Prob.	Countermeasures Hazard Controls	RAC Controlled/ Eliminated
Arming detonators	Explosive event	Inadvertent firing. Inadvertent discharge of capacitors.	Death or serious injury to personnel.	High (IxD)	Limit personnel in area. Check firing system and retain keys prior to connecting cables. Use high voltage detonators only.	Medium (Ix E)
Detonating explosives	Exposure to debris and blast overpressure	Detonation creating debris and overpressure	Death or serious injury to Personnel	High (Ix D)	Personnel located outside the K328 safety zone but inside the LAZ must be inside protective vans. All personnel must comply with controlled zones.	Medium (Ix E)
Post test inspection of test bed	Explosive event	Fire/possible low order detonation	Death or serious injury to personnel.	High (Ix D)	Limit personnel in area. Dispose of explosives in accordance with para 9.	Medium (Ix E)

Certified by: \_\_\_\_\_

Date: \_\_\_\_\_

**ANNEX C: Workplace Hazard Assessment PPE Certification**

In accordance with 29 CFR 1910.132(d)(2), this document is certification that a Workplace Hazard Assessment has been performed for:

1. T. O. or Workplace Evaluated: DISTINCT FALCON PROOF OF CONCEPT Test Bed
2. Location: Kirtland AFB, Chestnut Test Site
3. The Workplace Hazard Assessment necessitates using the following PPE:

	TASK/s	PPE
1.	Handling detonators	Eyes: Safety glasses with side shields.
2.	All fielding tasks	Eyes: Safety glasses with side shields as required. Feet: Safety shoes (C/I 75 Rating Minimum) are required at all times. Head: Class G or ABC hard hats when overhead hazards are assessed. Hands: Leather gloves for minor cuts and scrapes as required. Hearing: Disposable ear plugs NRR 31 or better when operating or working near heavy equipment.
3.	Handling bare explosives	Wash Hands after handling bare explosives or wear disposable gloves.
4.		
5.		
6.		
7.		
8.		
9.		

Certifying PI Signature \_\_\_\_\_ Date \_\_\_\_\_

## ANNEX D: DTRA PERSONNEL CONTROL PLAN

**1. Purpose.** The purpose of this attachment is to delineate the hazard zones for the DF-POC explosive operations. These hazard zones are designed to protect personnel and property from injury or damage due to an accidental detonation of the explosive charge while allowing test work to progress in a timely fashion. The following hazard zones are based on overpressure and fragment hazards, as described in paragraph 5.m. The Comp C-4 charges inside the FDD and PDD are considered as non-robust cased explosives even though the charges are uncased and not in contact with any steel components. For additional safety, the fragment hazards are based on a NEW of 7 pounds TNT equivalent. Overpressure hazards are based on impulse from a NEW of 62 pounds TNT equivalent explosive. For these tests the LAZ is 1935 ft from the GZ, the K328 is 1299 ft from the GZ, and the K105 is 416 ft from the GZ.

During the tests only those personnel that are essential to the test are allowed inside the Instrumentation Van (I-Van). The I-Van is located within the Limited Access Zone (LAZ) but outside the K328 safety zone as seen in Figure 1. The I-Van provides protection from the blast overpressure and debris for the personnel and equipment that are essential to the test. All other personnel will be evacuated outside the LAZ.

### 2. Definitions/Control Measures.

a. **LIMITED ACCESS ZONE (LAZ):** The purpose of the LAZ is to limit the number of personnel exposed to a detonation to only those essential for conducting the test.

1) **DISTANCE:** 1935 feet minimum for 7 pound fragmenting explosive charges in non-robust casing (AFMAN 91-201 Table 12.26B).

2) **ENFORCEMENT:** Road Guard are placed at the access roads leading to the LAZ (Figure 1). The DTRA/CXTS/SO will clear this area of non-essential personnel. Access will be limited to essential personnel as determined by the DTRA/SO. e.g. Test team members, Optics and Doc Photo, Instrumentation personnel etc.

3) **ESTABLISHED:** After the final dry run has been conducted as required in the countdown document.

b. **CONTROLLED ACCESS ZONE (CAZ):** The purpose of the CAZ is to restrict the number of personnel within the K24 (2.3 psi pressure range) while explosive handling or placement operations are in progress (AFM 91-201 Table 4.3). In the event of an accidental detonation, personnel outside this range and in the open are not expected to be killed or seriously injured by the blast pressure.

1) **DISTANCE:** 95 feet minimum (62 pound TNT equivalent K24).

2) **ENFORCEMENT:** The DTRA/CXTS/SO will maintain a visual watch to assure others complete their work and evacuate and unauthorized persons do not enter the hazard zone.

3) **ESTABLISHED:** The CAZ area will be evacuated of all non-essential personnel prior to the start of any activity that includes explosive handling or placement. This restriction into the CAZ area will be lifted when no active explosive operations are going on.

c. **EXCLUSION ZONE (EZ):** The purpose of the EZ is to restrict the number of personnel who have direct physical access to the explosives. This area is designed to allow for test fielding activities to continue within the 2.3 psi range. However, *NO ACTUAL HANDLING OR MOVING OF EXPLOSIVES WILL OCCUR WITHOUT FIRST ESTABLISHING THE CAZ.*

1) **DISTANCE:** A 25 foot radius from the explosive charge.

2) **ENFORCEMENT:** The ARA ordnance personnel guarding the explosives will not allow non-essential personnel within the EZ. The only personnel authorized in this zone are the explosive technicians, safety personnel, and Doc Photo.

3) **ESTABLISHED:** When explosives are on the test bed and when active explosive handling operations are in progress.

Attachment (2) J9-GIANT REUSABLE AIR BLAST SIMULATOR (GRABS) Test Site

## Health and Safety Risk Analysis (HASRA)

Task	Hazard	Cause	Effect	S	P	RAC	Elimination Substitution	Engineer Controls	Awareness	Training Procedures	PPE	S	P	RAC
<i>Test Bed</i>														
General Work	Cut	Grab sharp/rough objects	Injury	III	C	Med			Safety Brief		Leather Gloves	III	D	Med
General Work	Electric Shock	Lightning	Death	I	D	High	Take Cover in vicinity 10 miles	Lightning Detector	Safety Brief			I	E	Med
General Work	Explosion	Touching UXO	Death	I	D	High			Safety Brief	UXO Training		I	E	Med
General Work	Wildlife	Snakes/spiders	Injury	III	D	Low			Safety Brief	Emergency Response Plan	Gloves, Boots	III	E	Low
General Work	Falling Objects	Dropped, blown, or kicked off structure	Injury	III	C	Med	Limit access		Safety Brief		Hard hat	III	D	Low
General Work	Slip, Trip, Fall	Inattention	Injury	III	B	Med		Mark/barricade hazards	Safety Brief		Appropriate foot wear	III	D	Low
General Work	Temperature Extremes	Heat Stress/Cold	Injury	III	C	Med	Institute Work rest cycles	Temp Cont Trailer/Vehicle	Safety Brief		Sun block, Appropriate Clothing	III	D	Low
General Work	Projected particles, etc.	Foreign object in eye	Injury	II	C	High			Safety Brief		Safety Glasses (ANSI Z87.1)	II	D	Med
Driving	Impact	Speeding, Vehicle Control, Limited vision	Injury, death	I	C	High		Operators License	Safety Brief	DTRA Safety Video/Brief/	Seat belts	I	E	Med
Driving	Fire	Exhaust system temperature	Injury	IV	D	Low	Drive on roads only		Safety Brief			IV	E	Low
Hot Work	Fire	Ignition of material	Injury	III	C	Med	Safety Observer	Fire Ext. Hot work site	Safety Brief		Appropriate to task	III	E	Low
Equipment Operations	Noise	Generator, Construction Equipment	Loss of hearing	III	A	High	Limit access		Safety Brief		Hearing pro @ sound > 85 dB(A)	III	D	Med
Remote Area	All	All	Injury or Death	II	C	High	Maintain Awareness	Communication system	Safety Brief	First Aid & CPR	First Aid Kit	II	E	Med

Attachment (2) J9-GIANT REUSABLE AIR BLAST SIMULATOR (GRABS) Test Site**Health and Safety Risk Analysis (HASRA)**

Task	Hazard	Cause	Effect	S	P	RAC	Elimination Substitution	Engineer Controls	Awareness	Training Procedures	PPE	S	P	RAC
Working above 6-ft	Fall	Trip/fall	Injury or Death	I	C	High	Limit Access	Guardrails installed, fall protection	Safety Brief	Appropriate Training	Fall Protection Harness/PPE	I	D	High

*Explosive Operations*

Explosive Operations	Explosion	Lightning	Death	I	D	High	Evacuate if storm w/in 6 miles	Lightning Detector	Safety Brief	Explosive SOP Ammo Cert.		I	E	Med
Explosive Operations	Explosion	Dropping Ordnance	Death	I	D	High	Evacuate Non-essential Pers.	CAZ	Safety Brief	Explosive SOP Ammo Cert.		I	E	Med
Explosive Operations	Explosion	Static	Death	I	C	High	Equalize static potential	EBW used,	Safety Brief	Explosive SOP Ammo Cert.		I	E	Med
Explosive Operations	Explosion	RF, EMR	Death	I	C	High	No radio trans. 25'	EBW used,	Safety Brief	Explosive SOP Ammo Cert.		I	E	Med
Explosive Operations	Explosion	Malfunction/Misfire	Death	I	C	High	Wait Time, Minimum Pers., Shelter in Place	Road Guards		Explosive SOP Ammo Cert.		I	E	Med

*Test Event*

Detonate Explosives	Explosion/Impact	Detonation/Impact of fragments	Death	I	C	High	LAZ, CAZ, Attendance Sheet	Road Guards	Safety Brief			I	E	Med
Detonate Explosives	Hazard to Aircraft & Equipment	Impact of Fragments or Pressure	Death	I	D	High	Hold Channel	Safety Observers Equipment protection actions	Safety Brief			I	E	Med

*Post Test*

Re-entry	Explosion	Explosive residue	Death	I	D	High	Limit access		Safety Brief	Re-entry Plan		I	E	Med
Re-entry	Jagged metal	Damage to test structure	Injury	II	D	Med	Limit Access	Observe tape, safety barriers, signs, etc.	Safety Brief	Re-entry Plan	Gloves, Hard Hat, Boots	II	E	Med
Re-entry	Fire	Fireball or Hot Fragments	Injury	III	C	Med		Fire Ext.	Safety Brief	Fire Ext. Training		III	D	Low

Attachment (2) J9-GIANT REUSABLE AIR BLAST SIMULATOR (GRABS) Test Site**Health and Safety Risk Analysis (HASRA)**

Task	Hazard	Cause	Effect	S	P	RAC	Elimination Substitution	Engineer Controls	Awareness	Training Procedures	PPE	S	P	RAC
Re-entry	Structural Damage	Loose ground/rock/debris, fall hazard, cave-in	Injury or Death	I	D	High	Limit Access	Observe tape, safety barriers, signs, etc.	Safety Brief	Re-entry Plan	Hard Hat, boots, gloves	I	E	Med

Completed by: Bill D. Martinez, J9 Test Site Manager Date 14 Nov 2012

<Name>, Title

Certified by: Derrick Duke Date 14 Nov 2012

<Name>, Title

*Derrick Duke, DTRAJ4ET  
Test Safety Manager*

Attachment (2) J9-GIANT REUSABLE AIR BLAST SIMULATOR (GRABS)  
Test Site

Health and Safety Risk Analysis (HASRA)

Risk Assessment Matrix		PROBABILITY					
		Frequent	Likely (Probable)	Occasional	Seldom (Remote)	Unlikely (Improbable)	
		Likely To Occur Frequently	Will Occur Several Times	Likely To Occur Sometime	Unlikely But Possible To Occur	So Unlikely It Is Assumed Occurrence May Not Be Experienced	
		A	B	C	D	E	
S E V E R I T Y	<b>CATASTROPIC</b> Death or System Loss	I	Extremely High	Extremely High	High	High (Serious)	Medium
	<b>CRITICAL</b> Severe Injury or Major System Damage	II	Extremely High	High	High (Serious)	Medium	Low (Medium)
	<b>MODERATE</b> (Marginal) Minor Injury or Minor System Damage	III	High (Serious)	Medium (Serious)	Medium	Low (Medium)	Low (Medium)
	<b>NEGLIGIBLE</b> Less Than Minor Injury or System Damage	IV	Medium	Low (Medium)	Low	Low	Low

Risk Definitions

**CATASTROPIC**: Loss of ability to accomplish the mission. A frequent or likely probability of catastrophic loss (IA or IB) or frequent probability of critical loss (IIA) exists.

**High Risk**: Significant degradation of mission. Occasional to seldom probability of catastrophic loss (IC or ID) exists. A likely to occasional probability exists of a critical loss (IIB or IIC) occurring. Frequent probability of marginal losses (IIIA) exists.

**Moderate Risk**: Expected degraded mission capabilities. An unlikely probability of catastrophic loss (IE) exists. The probability of a critical loss is seldom (IID). Marginal losses occur with a likely or occasional probability (IIIB or IIIC). A frequent probability of negligible (IVA) losses exists.

**Low Risk**: Expected losses have little or no impact on accomplishing the mission. The probability of critical loss is unlikely (IIE), while that of marginal loss is seldom (IID) or unlikely (IIIE). The probability of a negligible loss is likely or less (IVB through IVE).

Reference: AFPM 90-902, DA PAM 385-1, & ATEC Regulation 385-1.

Note: Items in parenthesis in the matrix are categories used in MIL-STD 882D. MIL STD 882D is used for systems safety risk assessments and for operations at the Nevada Test Site. The above matrix is used for joint service operations and will be used for test operations at WSMR, KAFB,

Attachment (2) J9-GIANT REUSABLE AIR BLAST SIMULATOR (GRABS)  
Test Site

**Health and Safety Risk Analysis (HASRA)**

and other TDT test locations. ATEC Regulation 385-1 requires this risk matrix for operations on ATEC installations (WSMR) and the matrix is the example used in AFPM 90-902 & DAPAM 385-1.

**Management of Blast Noise Produced by the Defense Threat Reduction Agency's (DTRA)  
Explosive Test Operations at the GRABS Site; Kirtland AFB, NM**

**Dr. Robert Reinke, DTRA  
14 February 2013**

The Defense Threat Reduction Agency (DTRA) blasting operations at the GRABS Site are conducted and managed in such a manner so that off-test site blast noise, and associated annoyance to our on and off-base neighbors, is kept to a minimum. Vibration annoyance produced by ground motions propagated directly through the ground from the detonation point are generally not of concern. Far-field measurements have shown that, for the relatively small charge sizes involved at the GRABS Site, these vibrations are barely detectable above the manmade seismic noise produced by the adjacent Albuquerque metropolitan area. Blast noise produced by sound propagation through the air is another matter and is heavily influenced by both the atmospheric temperature and wind profiles with elevation above the ground.

Prior to any detonation capable of producing significant noise at an inhabited area off base, DTRA performs weather-based, far-field blast propagation predictions to ensure blast noise levels are minimized. These are followed up by actual blast noise measurements taken during the test event to confirm the predictions.

As a guideline for safe blast noise levels, DTRA follows the Federal Office of Surface Mining and Reclamation Enforcement (OSMRE) regulations for surface coal mine blasting (see: <http://arblast.osmre.gov/>). Section 816.67 defines the permitted levels of airblast as follows:

*(b) Airblast. (1) Limits. (i) Airblast shall not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area, except as provided in Paragraph (e) of this Section.*

<i>Lower frequency limit of measuring system, in Hz (+/- 3 dB)</i>	<i>Maximum level, in dB</i>
<i>0.1 Hz or lower-flat response<sup>1</sup></i>	<i>134 peak</i>
<i>2 Hz or lower-flat response</i>	<i>133 peak</i>
<i>6 Hz or lower-flat response</i>	<i>129 peak</i>
<i>C-weighted--slow response<sup>1</sup></i>	<i>105 peak dBC</i>

<sup>1</sup> Only when approved by the regulatory authority.

As noted above, the permitted noise levels vary with the frequency response of the measuring device. The system that DTRA employs meets the specifications of the **0.1 Hz or lower flat response** (Reference 1.) The 134 dB (decibel) level translates to 100 Pa (Pascal) in overpressure, which is the customary unit of measurement used by the Department of Defense (DOD) and DTRA blast noise community.

**Figures 1 and 2** show the expected range to 100 Pa overpressure for various idealized atmospheric profile conditions and surface charge sizes up to 2,000 pounds of TNT equivalent. Normally, DTRA would not execute a test during atmospheric conditions where pressure levels exceed the "standard" curve shown in the Figures. In general, due to the directional effect of wind, the resultant "noise contours" are not circles, but are instead elongated ellipses (see **Figure 3**).

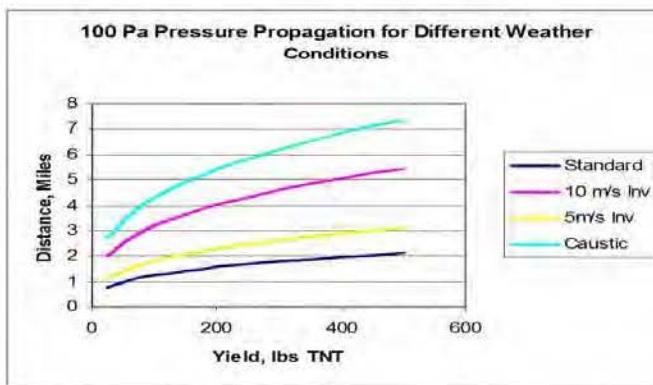


Figure 1. Range to 100 Pa pressure level for several idealized weather conditions for charge sizes under 500 pounds.

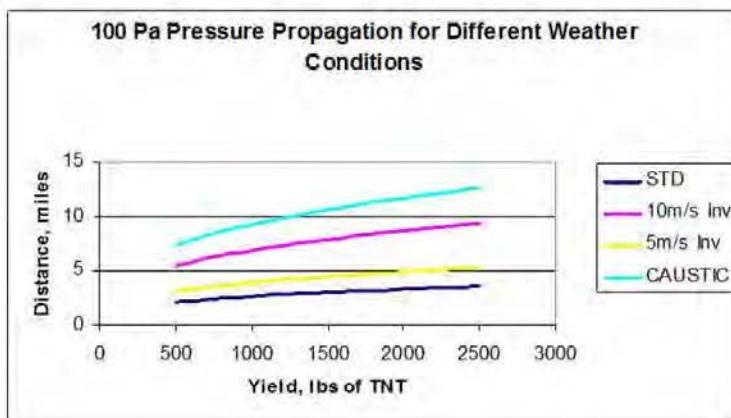
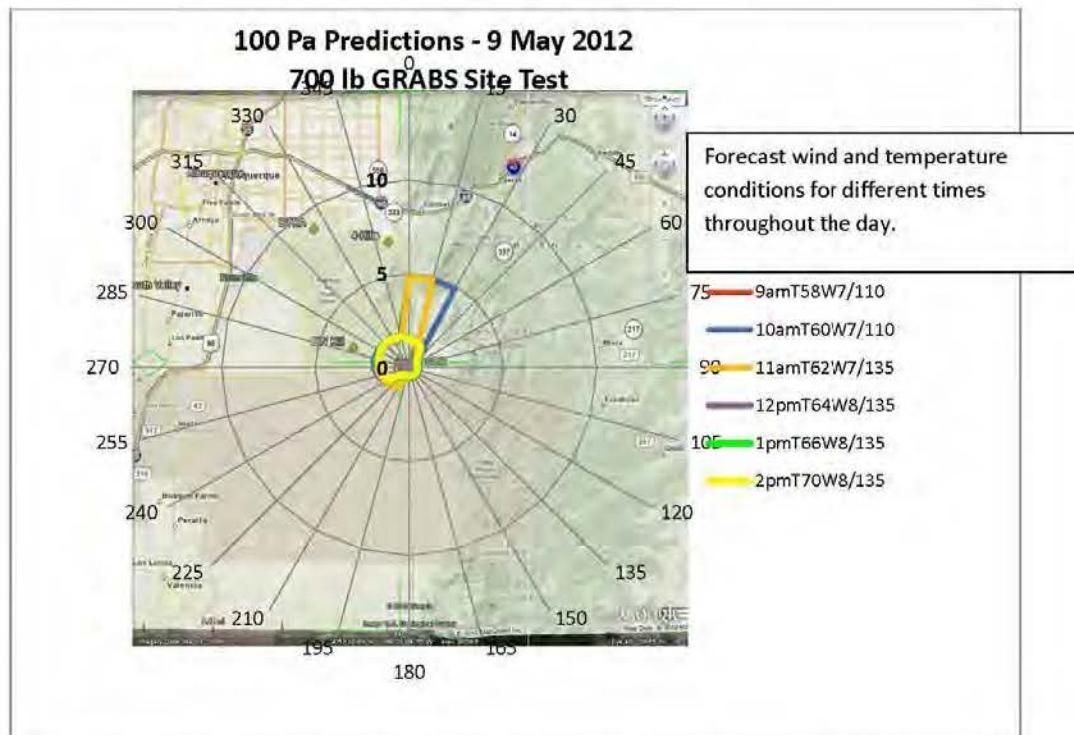


Figure 2. Range to 100 Pa pressure level for several idealized weather conditions for charge sizes from 500 to 2,000 pounds.

Far-field blast noise propagation predictions are performed using the BLASTO code (Reference 2) using the morning atmospheric soundings (i.e., balloon-borne radiosonde) available from the local office of the National Weather Service, as well as a number of real-time surface temperature and wind measurements from around Kirtland AFB. For larger detonations, DTRA operates a SODAR/RASS system that provides near real-time atmospheric temperature and wind profiles up to an altitude of 1,000 meters. If conditions are not favorable for minimal blast noise effects, the explosive test is placed in a hold situation until more favorable conditions prevail. Figure 3 provides a representative example of this process.



**Figure 3.** Example of a typical pre-test blast noise propagation prediction made using the BLASTO code. Ideally, DTRA would wait for 2pm weather conditions when the 100 Pa contour is at the minimal extent to execute the test.

#### References:

1. Reinke, R. J. Leverette, and C. Hayward, 2006, "On the use of differential pressure gages for low pressure blast measurements", in Proceedings of the 19<sup>th</sup> Symposium on the Military Applications of Blast and Shock, Calgary, Alberta, October 2006.
2. Reed, J.W., 1990, BLASTO: A PC Program for Predicting Positive Phase Overpressure at a Distance From an Explosion, JWR Inc. Albuquerque, NM.

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## **APPENDIX C**

**GRABS SITE FUGITIVE DUST CONTROL PROGRAMMATIC PERMIT  
AND KIRTLAND AFB OPEN BURN PERMIT**



**ALBUQUERQUE ENVIRONMENTAL HEALTH DEPARTMENT - AIR QUALITY DIVISION****PHYSICAL ADDRESS - ONE CIVIC PLAZA NW, 3<sup>RD</sup> FLOOR, ROOM 3047, ALBUQUERQUE, NEW MEXICO 87102****MAILING ADDRESS - P.O. BOX 1293, ALBUQUERQUE, NEW MEXICO 87103****(505) 768 - 1972 (VOICE) 1-800-659-8331 (NEW MEXICO RELAY) (505) 768 - 1977 (FAX)**

APPLICATION FOR A **FUGITIVE DUST CONTROL PROGRAMMATIC PERMIT** IN BERNALILLO COUNTY  
 ALBUQUERQUE - BERNALILLO COUNTY AIR QUALITY CONTROL BOARD REGULATION 20.11.20 NMAC  
 (ROUTINE MAINTENANCE/ACTIVE OPERATIONS PERMIT FOR SURFACE DISTURBANCE)

**DIVISION RECEIPT STAMP BELOW THIS LINE**

EFFECTIVE DATE OF THIS APPLICATION FORM: 2/16/11

SUBMITTAL DATE/TIME

RECEIVED BY

PERMIT #:

*9-6-11*  
*Albuquerque*  
*P012-0007*

A PROGRAMMATIC PERMIT (PERMIT) IS A FUGITIVE DUST CONTROL PERMIT, VALID FOR UP TO FIVE YEARS, ISSUED TO A PERMITTEE THAT PERFORMS ROUTINE MAINTENANCE OR ROUTINE ACTIVE OPERATIONS ON LAND OR AT FACILITIES OF  $\frac{1}{4}$  OF AN ACRE OR MORE, WHICH DOES NOT INCLUDE FULL DEPTH RECONSTRUCTION OF A ROADWAY OR SUBSTANTIAL REMOVAL AND REPLACEMENT OF A MANMADE FACILITY.

**PART A. - BUSINESS, AGENCY, OR PROPERTY OWNER**

(CLEARLY PRINT OR TYPE)

1. BUSINESS/AGENCY NAME UNITED STATES AIR FORCE, KIRTLAND AIR FORCE BASE

AND/OR

2. PROPERTY OWNERS NAME \_\_\_\_\_

**PART B. - FACILITY INFORMATION AND GENERAL ACTIVITIES**

(CLEARLY PRINT OR TYPE)

IF THE PERMITTEE WISHES TO INCLUDE MULTIPLE FACILITY (SITE) LOCATIONS UNDER THE SAME PERMIT, SUBMIT THE REQUIRED INFORMATION REQUESTED FOR EACH INDIVIDUAL SITE BY SUBMITTING ADDITIONAL COPIES OF PAGES 1 & 2 AS NECESSARY.

**SUBMIT AS AN ATTACHMENT TO THIS APPLICATION AN (8  $\frac{1}{2}$ " X 11" OR 11" X 17") SITE MAP FOR EACH FACILITY LOCATION**1. FUGITIVE DUST FACILITY (SITE) LOCATION Giant Reusable Air Blast Simulator (GRABS) Range, KIRTLAND AIR FORCE BASE

2. STREET ADDRESS OF FACILITY (if available) \_\_\_\_\_

3. MAJOR CROSS STREETS OR INTERSECTION NEARBY FACILITY LOVELACE ROAD AND TARGET ROAD4. TOTAL ACRES OF THIS FACILITY 1555. TOTAL ACRES OF THIS FACILITY SUBJECT TO ROUTINE MAINTENANCE/ACTIVE OPERATIONS 56. TOTAL MILES OF ROADS/EASEMENTS FOR THIS FACILITY SUBJECT TO ROUTINE MAINTENANCE/ACTIVE OPERATIONS N/A - EXEMPT CONDITIONALLY7. TOTAL MILES OF ROADS/EASEMENTS FOR THIS FACILITY CONVERTED TO ACRES N/A - EXEMPT8. PROVIDE A DESCRIPTION OF THIS FACILITY'S OPERATION(S) RESEARCH, TEST AND DEVELOPMENT OF EXPLOSIVES AND THE EFFECTS OF EXPLOSIVES ON STRUCTURES.9. DESCRIBE THE TYPE OF ACTIVITIES AT THIS FACILITY THAT MAY GENERATE FUGITIVE DUST BULLDOZERS AND OTHER HEAVY EQUIPMENT ARE USED TO CLEAR VEGETATION FOR TEST AREAS AND TO CREATE FIRE BREAKS AROUND TEST AREAS.**Page 1 of 5 (PROGRAMMATIC FUGITIVE DUST CONTROL PERMIT APPLICATION)**Department Review by JLRequired Initials of Permittee AT

**PART C. - SOURCE CLASSIFICATION AND FEE TABLE**

(CLEARLY PRINT OR TYPE)

A	B	C	D	E
SOURCE CLASSIFICATION (SEE DEFINITIONS AT THE BOTTOM OF THIS TABLE)	ACRES ROUNDED TO NEAREST WHOLE NUMBER TO BE CONTROLLED AT EACH SOURCE CLASSIFICATION FROM COLUMN A (CONVERT MILES TO ACRES)	EMISSION CONTROL FACTOR MULTIPLIER (20.11.2.7 NMAC FEES REGULATION)	GENERAL DESCRIPTION OF THE REASONABLY AVAILABLE CONTROL MEASURE(S) CURRENTLY IN PLACE OR TO BE USED TO MAINTAIN THE ACREAGE AT EACH SOURCE CLASSIFICATION CLAIMED IN COLUMN A (SEE PART E LIST ON PAGE 3) (EXAMPLE: TRAFFIC, WINDBREAKS, ETC.)	TOTAL FEE PER CLASSIFICATION [COLUMN B TIMES (X) COLUMN C]
LOW IMPACT		.1		
MODERATE IMPACT	5	.5	MINIMAL TRAFFIC; WATERING DURING ACTIVE OPERATIONS	2.5
HIGH IMPACT		.9		
<b>MULTIPLY THE SUM OF COLUMN (E) BY \$127.00</b>			<b>\$127.00 X</b>	<b>2.5</b>
			<b>ANTICIPATED PERMIT FEE DUE</b>	<b>\$317.50</b>
<b>ABBREVIATED DEFINITIONS OF SOURCE CLASSIFICATIONS</b>				
<b>NO IMPACT</b> MEANS ACTIVE AND INACTIVE SURFACE AREAS THAT PRODUCE VIRTUALLY NO FUGITIVE DUST. SUCH LAND SURFACES ARE EXEMPT FROM THE FUGITIVE DUST CONTROL REGULATION OR REQUIREMENTS TO PAY FEES				
<b>LOW IMPACT</b> MEANS ACTIVE AND INACTIVE SURFACE AREAS THAT ARE APPROXIMATELY 90% CONTROLLED				
<b>Moderate Impact</b> MEANS ACTIVE AND INACTIVE SURFACE AREAS THAT ARE APPROXIMATELY 50% CONTROLLED				
<b>HIGH IMPACT</b> MEANS ACTIVE AND INACTIVE SURFACE AREAS THAT ARE APPROXIMATELY 10% CONTROLLED				

UPON RECEIPT OF YOUR APPLICATION, THE DEPARTMENT WILL REVIEW AND VERIFY THE INFORMATION SUBMITTED. ONCE THE DEPARTMENT HAS DETERMINED THAT THE APPLICATION IS COMPLETE, THE DEPARTMENT WILL SIGN THE APPLICATION AND RETURN A COMPLETED COPY TO YOU AS YOUR PERMIT. SUBSEQUENTLY, AN INVOICE WILL BE SENT TO YOU FOR INITIAL PAYMENT OF THE PERMIT FEE. EACH YEAR THEREAFTER, THE DEPARTMENT WILL ALSO SEND AN INVOICE FOR THE ANNUAL FEES DUE. THE APPLICATION MAY BE SENT BY MAIL TO THE ADDRESS THAT APPEARS AT THE TOP OF PAGE 1 OF THIS FORM OR IT MAY BE HAND DELIVERED TO THE SAME ADDRESS BETWEEN THE HOURS OF 8:00AM - 4:30PM MONDAY THROUGH FRIDAY.

**PART D. - FUGITIVE DUST CONTROL PLAN**

(CLEARLY PRINT OR TYPE)

THE "PERMITTEE" IS REQUIRED TO COMPLY WITH A FUGITIVE DUST CONTROL PLAN (PLAN) THAT DETAILS THE FUGITIVE DUST CONTROL MEASURES THAT WILL BE USED TO MITIGATE THE RELEASE OF FUGITIVE DUST FROM ROUTINE ACTIVE OPERATIONS AND MAINTENANCE. IF YOU ARE NOT SUBMITTING, AS AN ATTACHMENT TO THIS APPLICATION, AN ALTERNATIVE PLAN THEN YOU MUST COMPLETE PART D1 - D2 BELOW TO COMPLETE YOUR FUGITIVE DUST CONTROL PLAN.

1. SUMMARIZE IN DETAIL, HOW THE REASONABLY AVAILABLE CONTROL MEASURES CURRENTLY IN PLACE, OR THAT YOU HAVE SELECTED IN COLUMN C OF THE PART C TABLE ABOVE WILL BE USED TO LIMIT OR PREVENT THE RELEASE OF FUGITIVE DUST FROM ROUTINE ACTIVE OPERATIONS AND/OR MAINTENANCE AT THIS FACILITY. (FOR EXAMPLE CREDIT CAN BE TAKEN FOR: EXISTING TREES OR SHRUBBERY, ALONG AT LEAST 50% OF THE PERIMETER OF THE FACILITY, AS A WINDBREAK; OR SALVAGED VEHICLES, MATERIALS, OR EQUIPMENT AT A SALVAGE YARD THAT FORM AN EFFECTIVE WINDBREAK; OR EXISTING FENCING THAT PREVENTS VEHICLE ACCESS TO PROPERTY AS A TRAFFIC CONTROL). DESCRIBE THE HEIGHT, LENGTH, LOCATIONS, TYPES, AMOUNTS, ETC. FOR ALL METHODS TO BE USED AS CONTROL MEASURES. AS A GENERAL RULE, THE DEPARTMENT WILL ALLOW CREDIT FOR WINDBREAKS FOR A LATERAL DISTANCE EQUAL TO 10 TIMES THE HEIGHT OF THE WINDBREAK. THEREFORE, A 6 FOOT HIGH WINDBREAK WILL BE CREDITED WITH REDUCING DUST EMISSIONS FOR A DISTANCE OF 60 FEET FROM THE FENCE.

Watering will be done during soil disturbance activities to minimize dust. There is no traffic activity on these areas except for heavy equipment used at the time of maintenance and minor vehicle traffic on the cleared area during the exercise.

2. DESCRIBE THE ACTION(S) THAT WILL BE TAKEN TO MITIGATE CLAIMS OF PROPERTY DAMAGE BY FUGITIVE DUST AT/FROM THIS FACILITY.

The GRABS Range is within the fence line of Kirtland AFB and is not accessible to the general public. The range is in a remote area of the facility. It is unlikely that fugitive dust will cause problems. However, all complaints will be investigated and addressed thoroughly.

Page 2 of 5 (PROGRAMMATIC FUGITIVE DUST CONTROL PERMIT APPLICATION)

Department Review by \_\_\_\_\_

Required Initials of Permittee \_\_\_\_\_

**PART E. - REASONABLY AVAILABLE CONTROL MEASURES**

THE "PERMITTEE" SHALL INCLUDE IN THE PERMIT APPLICATION ONE OR MORE OF THE APPLICABLE REASONABLY AVAILABLE CONTROL TYPE MEASURES LISTED BELOW (ABBREVIATED LIST), OR ONE OR MORE OTHER (ALTERNATIVE) FUGITIVE DUST CONTROL MEASURES, INCLUDING MEASURES TAKEN TO COMPLY WITH ANY OTHER STATUTE OR REGULATION THAT WOULD ALSO EFFECTIVELY CONTROL FUGITIVE DUST DURING ROUTINE ACTIVE OPERATIONS AND MAINTENANCE AND INACTIVE OPERATIONS. FOR A MORE COMPLETE LIST OF CONTROL TYPE MEASURES YOU CAN REFER TO SECTION 23 OF PART 20.11.20 NMAC – FUGITIVE DUST CONTROL.

IF THE "PERMITTEE" CHOOSES TO SUBMIT AS AN ATTACHMENT TO THIS APPLICATION AN ALTERNATIVE FUGITIVE DUST CONTROL PLAN (PLAN) IN LIEU OF USING ANY OF THE REASONABLY AVAILABLE CONTROL MEASURES GIVEN IN PART E BELOW OR FROM SECTION 23 OF PART 20.11.20 NMAC – FUGITIVE DUST CONTROL, THE ALTERNATIVE PLAN (SUCH AS A STORM WATER POLLUTION PREVENTION PLAN) MUST INCLUDE DETAILED INFORMATION THAT ADDRESSES: 1) THE REASONABLY AVAILABLE CONTROL MEASURES TO MITIGATE THE RELEASE OF FUGITIVE DUST FROM ROUTINE ACTIVE OPERATIONS AND MAINTENANCE; AND 2) ACTION(S) TO BE TAKEN TO MITIGATE PROPERTY DAMAGE (SEE PART D OF THIS APPLICATION). IF SUBMITTING AN ALTERNATIVE PLAN YOU STILL MUST COMPLETE PARTS A, B, C, F, AND G OF THIS APPLICATION.

USE THE ONE WORD UNDERLINED HEADINGS BELOW WHEN FILLING IN THE CONTROL MEASURES IN COLUMN C OF THE PART C TABLE ON PAGE 2. THESE MEASURES CAN REDUCE THE RELEASE OF FUGITIVE DUST FROM YOUR FACILITY OR REDUCE THE AMOUNT OF ACREAGE/MILES REQUIRING CONTROL IF APPLIED AS PERMANENT STABILIZATION (FOR EXAMPLE: MAINTAINED PAVEMENT).

**PAVING**

- paving using well-maintained recycled asphalt, asphaltic concrete, concrete, or petroleum products legal for such use;
- using paved or gravel entry/exit aprons with devices, such as steel grates, capable of knocking mud and bulk material off vehicle tires;
- surfacing with gravel or other mulch material of a size and density sufficient to prevent surface material from becoming airborne

**WATERING**

- using wet suppression;
- watering the site at the beginning and/or end of each day sufficient to stabilize the area;
- using dust suppressants applied in amounts, rates, and maintained as recommended by the manufacturer (submit manufacturer's data with application)

**WINDBREAKS**

- installing upwind windbreaks, including fabric fences with the bottom of the fence sufficiently anchored to the ground to prevent material from blowing underneath the fence; all windbreaks and fabric fences should be maintained in an upright and functional condition at all times; all accumulated material on the windward side of the windbreak should be periodically removed to prevent failure of the windbreak;
- installing permanent perimeter and interior walls;
- For Salvage Yards - using salvaged vehicles arranged in rows with minimum spacing between vehicles;
- For Construction or Storage Yards – using construction materials, equipment, trailers, buildings or structures to create a windbreak;
- Using dense hedges, shrubbery or trees;
- Using sand fences, board rail fences, or similar fences that have openings on approximately 50% of the surface;
- Natural barriers

**TRAFFIC**

- using traffic controls, including decreased speed limits with appropriate enforcement; other traffic calming methods, vehicle access restrictions and controls; road closures or barricades; and off-road vehicle access controls and closures;
- cleaning up spillage and track out as necessary to prevent particulates from being pulverized and entrained into the atmosphere;
- performing regularly scheduled vacuum street cleaning or wet sweeping;
- using properly secured tarps or cargo covering that covers the entire surface area of the load;
- installing fencing to limit vehicle access to property

**LANDSCAPING**

- reseeding using native grasses as specified in 20.11.20.24 NMAC – NATIVE GRASS SEEDING AND MULCH SPECIFICATIONS;
- xeriscaping;
- mulching and crimping of straw or hay as specified in Section 20.11.20.24 NMAC;
- conventional landscaping techniques

IT IS REQUIRED DURING A HIGH WIND EVENT THAT ALL FUGITIVE DUST SOURCES CEASE ALL ACTIVE OPERATIONS THAT ARE CAPABLE OF PRODUCING FUGITIVE DUST. A HIGH WIND EVENT IS A CONDITION ANNOUNCED BY THE DEPARTMENT OF WIND SPEEDS OF APPROXIMATELY 30 MILES PER HOUR OR GREATER THAT, WHEN ACCOMPANIED BY DRY SOIL CONDITIONS, IS LIKELY TO RESULT IN WIDESPREAD REDUCED VISIBILITY DUE TO BLOWING FUGITIVE DUST AND MAY RESULT IN ELEVATED PARTICULATE LEVELS THAT MAY CONTRIBUTE TO AN EXCEEDANCE OR VIOLATION OF AMBIENT AIR QUALITY STANDARDS.

Page 3 of 5 (PROGRAMMATIC FUGITIVE DUST CONTROL PERMIT APPLICATION)

Department Review by \_\_\_\_\_

Required Initials of Permittee 

**PART F. - SIGNATURE AUTHORITY OF PERMITTEE**

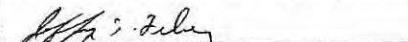
THIS APPLICATION SHALL INCLUDE A FUGITIVE DUST CONTROL PLAN THAT MAY UTILIZE REASONABLY AVAILABLE CONTROL MEASURES TO MITIGATE FUGITIVE DUST TO MEET THE OBJECTIVES OF PART 20.11.20 NMAC – FUGITIVE DUST CONTROL.

BY SIGNING BELOW, THE APPLICANT CERTIFIES THAT THE INFORMATION PROVIDED IN THIS APPLICATION FOR A FUGITIVE DUST CONTROL PROGRAMMATIC PERMIT IS TRUE, ACCURATE AND COMPLETE, AND THE APPLICANT AGREES TO BE THE "PERMITTEE".

A "PERMITTEE" IS A PERSON, OWNER OR OPERATOR AND ALL LEGAL HEIRS, SUCCESSORS, AND ASSIGNS WHO HAS APPLIED FOR AND OBTAINED A FUGITIVE DUST CONTROL PERMIT APPROVED BY THE DEPARTMENT. THE "PERMITTEE" AGREES TO TAKE ALL ACTIONS REQUIRED BY THE FUGITIVE DUST CONTROL PERMIT ISSUED BY THE DEPARTMENT TO PREVENT A VIOLATION OF 20.11.20 NMAC – FUGITIVE DUST CONTROL, INCLUDING STOPPING ACTIVE OPERATIONS, IF NECESSARY. THE "PERMITTEE" IS RESPONSIBLE FOR COMPLYING WITH THE FUGITIVE DUST CONTROL PERMIT, THE FUGITIVE DUST CONTROL PLAN, AND ALL REQUIREMENTS OF PART 20.11.20 NMAC - FUGITIVE DUST CONTROL. FAILURE TO COMPLY SHALL BE A VIOLATION OF PART 20.11.20 NMAC – FUGITIVE DUST CONTROL.

THE PERMITTEE SIGNATURE BOX MUST BE COMPLETED

[ONE SET OF SIGNATURE PAGES IS ADEQUATE FOR MULTIPLE FACILITY (SITE) LOCATIONS TO BE PERMITTED UNDER THE SAME PERMITTEE AND OWNER]

DEFENSE THREAT REDUCTION AGENCY (DTRA/CXTS) IF A BUSINESS, PRINT PERMITTEE'S BUSINESS NAME		(COMPLETE ALL APPLICABLE INFORMATION)	
Jeffrey T. Fraher PRINT NAME OF INDIVIDUAL SIGNING FOR PERMITTEE		Range Manager PRINT TITLE OF INDIVIDUAL SIGNING FOR PERMITTEE	
 SIGNATURE OF PERMITTEE		<i>JTF</i> INITIALS OF PERMITTEE	<i>25 Jul 2011</i> DATE SUBMITTED
1680 Texas St SE MAILING ADDRESS OF PERMITTEE	Kirtland AFB CITY	NM STATE	87117 ZIP CODE
(505) 846-6991 PHONE NUMBER OF PERMITTEE	(505) 331-3021 CELL PHONE OF PERMITTEE	N/A PAGER NUMBER OF PERMITTEE	(505) 846-9670 FAX NUMBER OF PERMITTEE
jeffrey.fraher@dtra.mil EMAIL ADDRESS OF PERMITTEE			

THE PERMITTEE SHALL MAKE THE PERMIT AVAILABLE AND EXPLAIN THE REQUIREMENTS OF THE PERMIT TO APPROPRIATE EMPLOYEES, AGENTS, CONTRACTORS, AND ANY OTHER PERSON INVOLVED IN ACTIVE OPERATIONS OR MAINTENANCE AT THIS FACILITY TO ASSIST IN MAINTAINING COMPLIANCE WITH PART 20.11.20 – FUGITIVE DUST CONTROL.

THE PERMITTEE IS RESPONSIBLE FOR MAINTAINING CONTROL MEASURES THAT PREVENT OR ABATE UNREASONABLE INTERFERENCE WITH PUBLIC WELFARE, VISIBILITY AND THE REASONABLE USE OF PROPERTY.

THE APPLICANT SIGNING ABOVE AND APPLYING TO BE THE "PERMITTEE", MAY DESIGNATE AN ADDITIONAL PERSON(S) [INCLUDES AN ENTITY(IES)] TO BE A RESPONSIBLE PERSON AS DEFINED IN 20.11.20.7DD NMAC (DEFINITIONS), IF THE PERSON(S) AGREES IN WRITING TO BE A RESPONSIBLE PERSON.

BEFORE DEPARTMENT REVIEW AND ISSUANCE OF A FUGITIVE DUST CONTROL PROGRAMMATIC PERMIT, IF THE PERMITTEE WISHES TO DESIGNATE A PERSON(S) AS A RESPONSIBLE PERSON(S) FOR COMPLYING WITH ALL OR SPECIFIC ELEMENTS OF THE FUGITIVE DUST CONTROL PERMIT, THE FUGITIVE DUST CONTROL PLAN, AND PART 20.11.20 NMAC - FUGITIVE DUST CONTROL, THEN THE PERMITTEE MAY REQUEST AN ADDITIONAL RESPONSIBLE PERSON SIGNATURE FORM, WHICH MAY BE ADDED TO THE FUGITIVE DUST CONTROL PERMIT APPLICATION. THE RESPONSIBLE PERSON SIGNATURE FORM MUST INCLUDE ALL APPLICABLE INFORMATION CONCERNING THE DESIGNATED RESPONSIBLE PERSON(S). AFTER THE ISSUANCE OF THE PERMIT, THE DEPARTMENT MAY APPROVE IN WRITING AN AMENDMENT TO THE PERMIT TO ADD OR CHANGE A DESIGNATED RESPONSIBLE PERSON(S).

Page 4 of 5 (PROGRAMMATIC FUGITIVE DUST CONTROL PERMIT APPLICATION)

Department Review by 

Required Initials of Permittee 

**PART G. – FACILITY OWNER INFORMATION** (COMPLETE THE OWNER INFORMATION BELOW ONLY IF DIFFERENT THAN THE PERSON WHO HAS SIGNED AS THE PERMITTEE IN SECTION F.

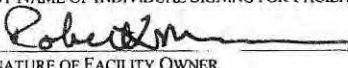
**However,** READ ALL THE INFORMATION BELOW, EVEN IF NOT SIGNING THE FACILITY OWNER INFORMATION BOX. THE PERMITTEE MUST INITIAL THE BOTTOM RIGHT CORNER OF ALL 5 PAGES TO ENSURE THAT ALL THE APPLICATION INFORMATION PROVIDED HAS BEEN REVIEWED.

**IF THE PERMITTEE FAILS TO COMPLY WITH THE PROVISIONS OF 20.11.20 NMAC – FUGITIVE DUST CONTROL, THE OWNER, IF DIFFERENT FROM THE PERMITTEE, SHALL BE RESPONSIBLE FOR COMPLYING WITH THE PERMIT. IF THE PERMITTEE FAILS TO TAKE ALL REQUIRED ACTIONS TO PREVENT A VIOLATION OF 20.11.20 NMAC – FUGITIVE DUST CONTROL, THE OWNER SHALL BE RESPONSIBLE TO TAKE ALL ACTIONS REQUIRED TO PREVENT OR SATISFACTORILY RESOLVE A VIOLATION OF 20.11.20 NMAC – FUGITIVE DUST CONTROL, INCLUDING STOPPING ALL ACTIVE OPERATIONS, IF NECESSARY. TO MITIGATE FUGITIVE DUST, ALL INACTIVE DISTURBED SURFACE AREAS MUST BE STABILIZED AND MAINTAINED IN STABLE CONDITION BY THE OWNER, PERMITTEE OR PERSON RESPONSIBLE FOR MAINTENANCE OF THE FACILITY. FAILURE TO COMPLY SHALL BE A VIOLATION OF 20.11.20 NMAC – FUGITIVE DUST CONTROL.**

**FACILITY OWNER INFORMATION** (COMPLETE ALL APPLICABLE INFORMATION)

UNITED STATES AIR FORCE, KIRTLAND AIR FORCE BASE  
If a business, print facility owner's business name

Robert L. Maness, Colonel, USAF  
Print name of individual signing for facility owner

  
Signature of Facility Owner

**Installation Commander**

Print title of individual signing for facility owner

  
Initials of Facility Owner

AUG 26 2011  
Date signed

2050 Wyoming Blvd SE  
Mailing address of facility owner

Kirtland AFB  
City

NM  
State

87117  
Zip code

(505) 853-3481  
Phone of facility owner

N/A  
Cell of facility owner

N/A  
Pager of facility owner

(505) 853-6970  
Fax of facility owner

jennifer.dann@kirtland.af.mil  
Email address of facility owner

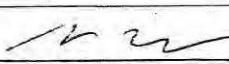
THE GENERAL PROVISIONS OF 20.11.20 NMAC – FUGITIVE DUST CONTROL – STATES THAT IT SHALL BE A VIOLATION OF 20.11.20 NMAC TO ALLOW FUGITIVE DUST, TRACK-OUT, OR TRANSPORTED MATERIAL FROM ANY ACTIVE OPERATION, OPEN STORAGE PILE, STOCKPILE, PAVED OR UNPAVED ROADWAY, DISTURBED SURFACE AREA, OR INACTIVE DISTURBED SURFACE AREA TO CROSS OR BE CARRIED BEYOND THE PROPERTY LINE, RIGHT-OF-WAY, EASEMENT OR ANY OTHER AREA UNDER CONTROL OF THE PERSON GENERATING OR ALLOWING THE FUGITIVE DUST IF THE FUGITIVE DUST MAY:

- 1) WITH REASONABLE PROBABILITY INJURE HUMAN HEALTH OR ANIMAL OR PLANT LIFE;
- 2) UNREASONABLY INTERFERE WITH THE PUBLIC WELFARE, VISIBILITY OR THE REASONABLE USE OF PROPERTY;
- 3) BE VISIBLE FOR A TOTAL OF 15 MINUTES OR MORE DURING ANY CONSECUTIVE ONE HOUR OBSERVATION PERIOD USING THE VISIBLE FUGITIVE DUST DETECTION METHOD IN 20.11.20.26 (VISUAL DETERMINATION OF FUGITIVE DUST EMISSIONS VIOLATIONS) OR AN EQUIVALENT METHOD APPROVED IN WRITING BY THE DEPARTMENT.

PURSUANT TO THE AIR QUALITY CONTROL ACT, CHAPTER 74, ARTICLE 2 NEW MEXICO STATUTES ANNOTATED 1978, AS AMENDED; THE ALBUQUERQUE JOINT AIR QUALITY CONTROL BOARD ORDINANCE, 9-5-1-1 ROA 1994; THE BERNALILLO COUNTY JOINT AIR QUALITY CONTROL BOARD ORDINANCE, BERNALILLO COUNTY ORDINANCE 94-5, AND THE ALBUQUERQUE/BERNALILLO COUNTY AIR QUALITY CONTROL BOARD (ABCQCB) REGULATION TITLE 20, CHAPTER 11, PART 20, NEW MEXICO ADMINISTRATIVE CODE (NMAC), (20.11.20 NMAC) - FUGITIVE DUST CONTROL, AND UPON AUTHORIZED SIGNATURES BELOW, THIS APPLICATION TOGETHER WITH ASSOCIATED DRAWINGS, PLANS, APPENDED DOCUMENTS, OTHER DATA, AND ANY CONDITIONS ATTACHED TO THE PERMIT BY THE DEPARTMENT, WILL BECOME THE FUGITIVE DUST CONTROL PROGRAMMATIC PERMIT.

**AREA BELOW FOR DEPARTMENT USE.**

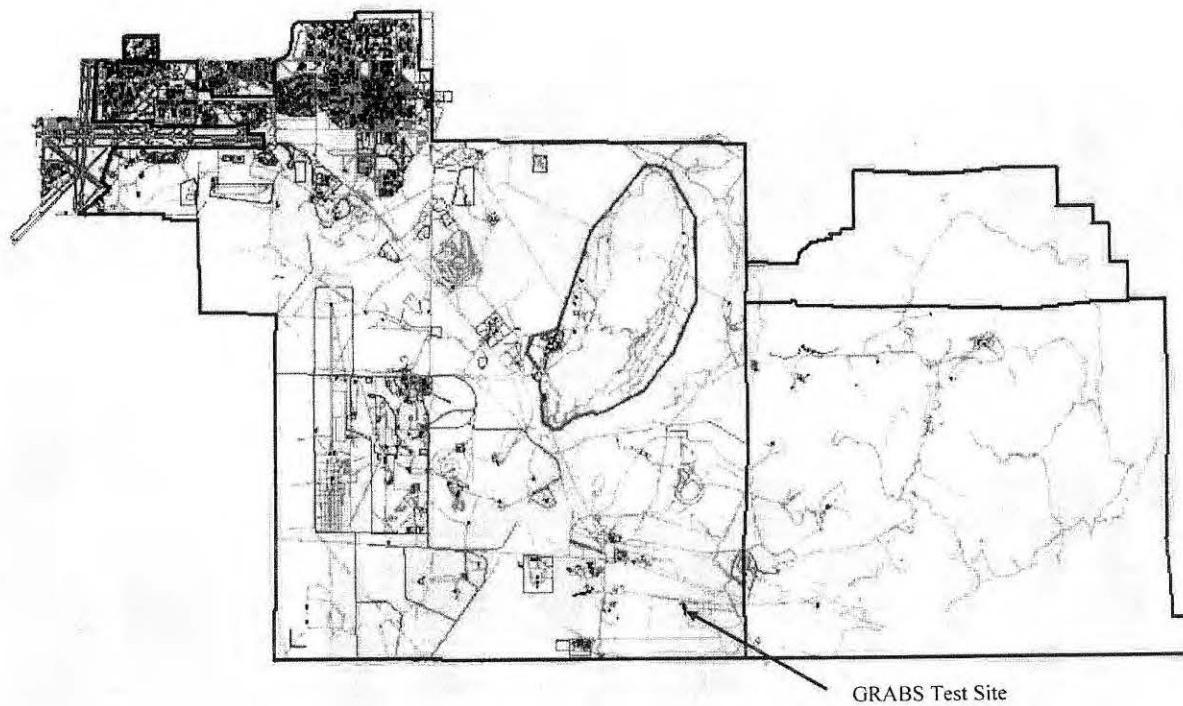
DOES THE DEPARTMENT APPROVAL BELOW INCLUDE APPROVAL FOR ANY BULK MATERIAL STOCKPILES TO EXCEED 15 FEET  YES  NO  
IF YES, MAXIMUM HEIGHT ALLOWED \_\_\_\_\_ FEET

APPLICATION REVIEWED BY:	DEEMED COMPLETE DATE	PERMIT ISSUED BY:	ISSUE DATE	EXPIRATION DATE
 AIR QUALITY DIVISION	9/12/20	 AIR QUALITY DIVISION	9/28/2011	9/28/2016

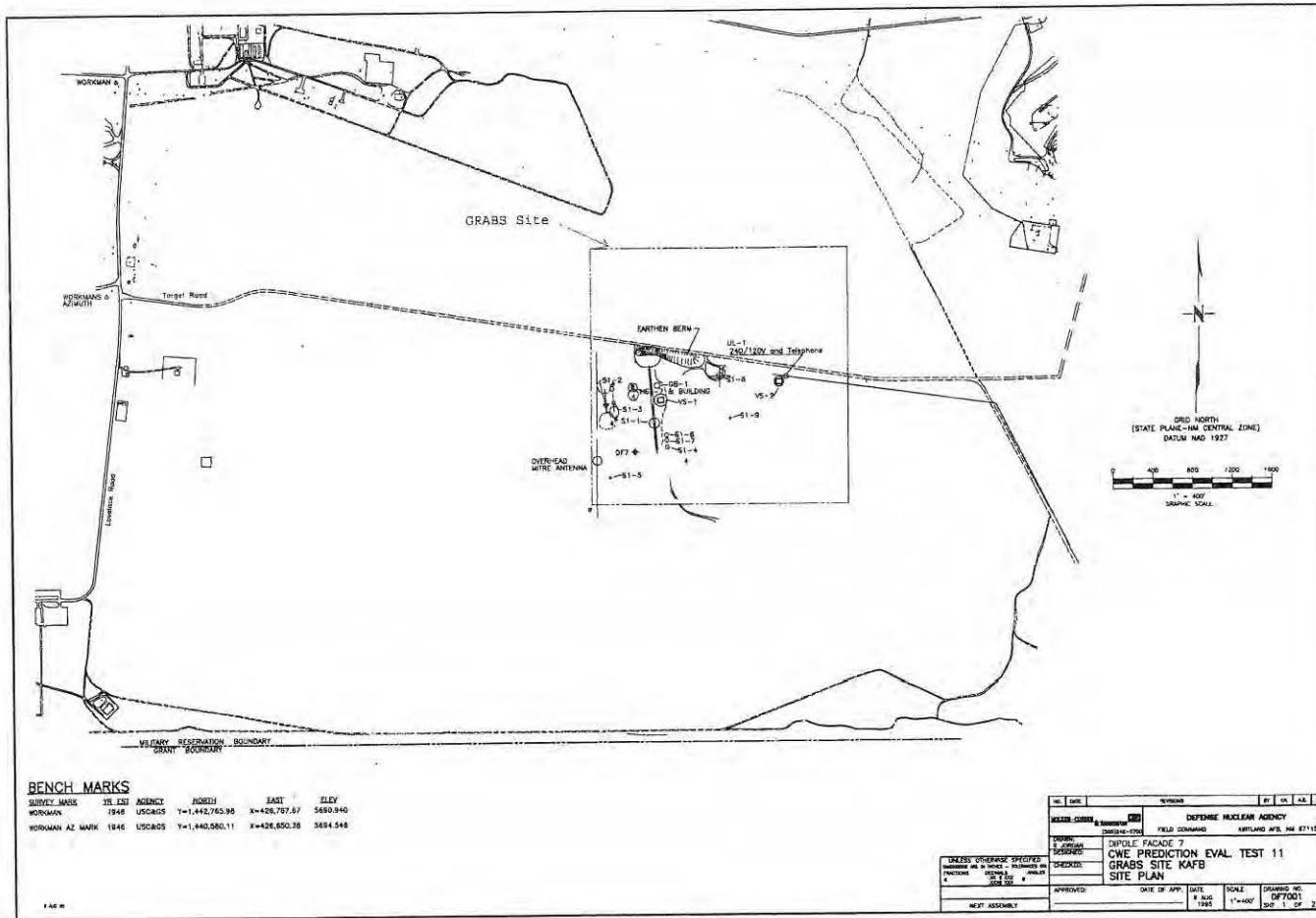
Page 5 of 5 (PROGRAMMATIC FUGITIVE DUST CONTROL PERMIT APPLICATION)

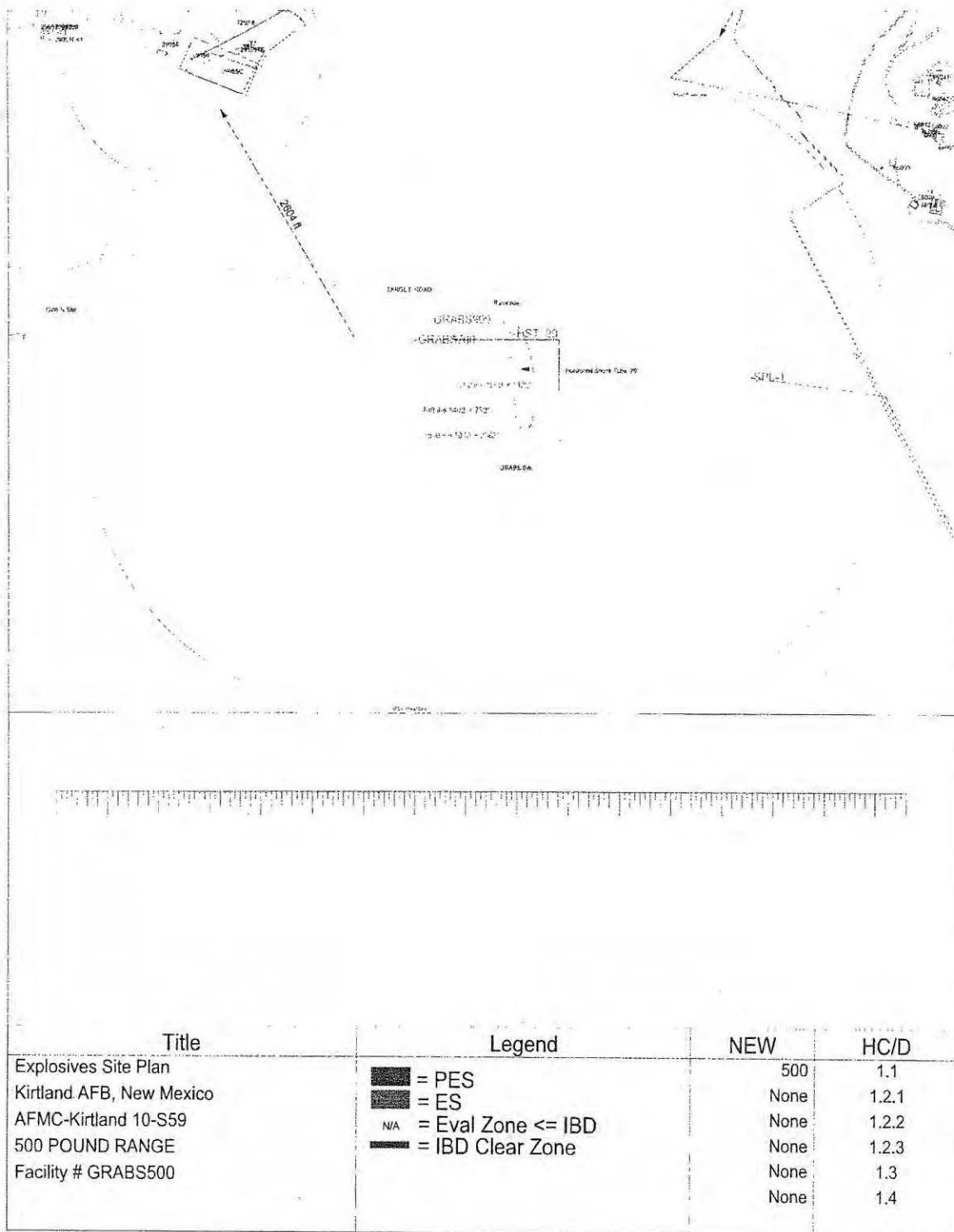
Department Review by 

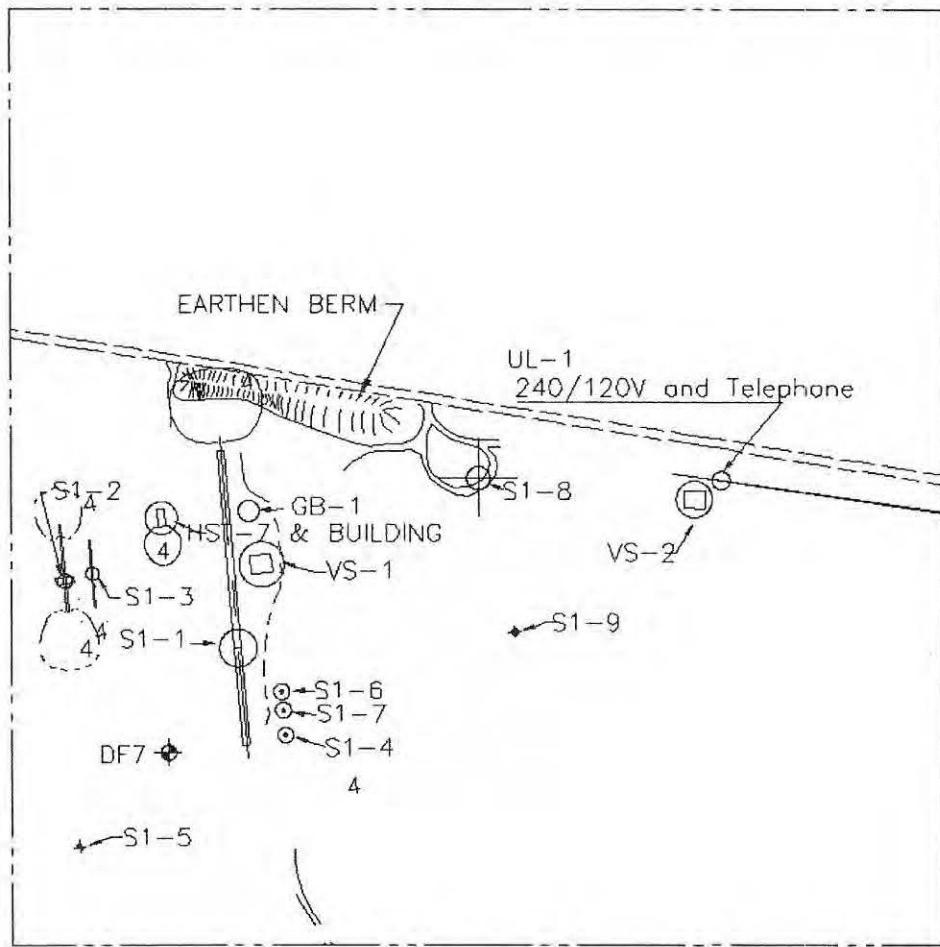
Required Initials of Permittee 



**Programmatic Fugitive Dust Permit for GRABS Test Site Range Maintenance  
Kirtland Air Force Base, Albuquerque, New Mexico**







*Albuquerque Environmental Health Department  
Air Quality Division*

September 28, 2011

Robert L. Maness, Colonel, United States Air Force (USAF)  
Kirtland Air Force Base (KAFB)  
2050 Wyoming Blvd. SE  
Albuquerque, NM 87117

Dear Colonel Robert L. Maness,

Based on the application received by the Air Quality Division (AQD) on September 6, 2011 the AQD has deemed your application complete and is hereby issuing your Giant Reusable Air Blast Simulator (GRABS) Range KAFB Programmatic Permit.

This permit covers routine maintenance or routine ongoing active operations on existing land or facilities, at single or multiple locations, which does not include full depth reconstruction of a roadway or substantial removal and replacement of a manmade facility. Programmatic permits are issued to address work activities that result in similar earth moving or surface disturbance activities and utilize similar fugitive dust abatement strategies.

Programmatic permits are valid for up to five years and the permittee shall pay an annual fee for each year covered by the programmatic permit. The department will request that an invoice be processed and sent to USAF, KAFB for initial payment of the permit fee to cover the first annual permit cycle. Receipt by the department of subsequent annual fees shall result in an automatic renewal of the programmatic permit. The term of each programmatic permit will be from July 1st through the following June 30th. A new permit application shall be required every five years or earlier if the surface disturbance activities or fugitive dust abatement strategies are modified.

The AQD wishes to thank the USAF, KAFB staff for their interest and input to the new permitting processes that are being implemented as a result of recent changes in the Fugitive Dust Control regulation.

Enclosed is your approved Fugitive Dust Control Programmatic Permit # P12-0007 for USAF, GRABS, KAFB.

Sincerely,



Chris Luna  
Environmental Health Specialist II  
Enforcement Section  
Air Quality Division  
Albuquerque Environmental Health Department  
(505) 767-5620



*City of Albuquerque*  
*Environmental Health Department*  
 P.O. Box 1293  
 ALBUQUERQUE, NEW MEXICO 87103



**OPEN BURN PERMIT #: 14-0001**

**ISSUED TO:** USAF, Kirtland AFB  
 2050 Wyoming Blvd SE  
 KAFB, NM 87117

**CONTACT:** Andria Cuevas  
 (505) 846-2522  
[andria.cuevas@kirtland.af.mil](mailto:andria.cuevas@kirtland.af.mil)

**Type of Open Burn Permit:** Cond App Mult Event Open Burn

**Location in Bernalillo County:** Kirtland AFB

**Purpose of Burn Permit:** Disposal of Explosives

**STATUTORY AUTHORITY:**

The Environmental Health Department ('Department') is authorized to administer and enforce actions regarding 11.21.11 the subject of this Order pursuant to the federal Clean Air Act, 42 U.S.C. §§7401 to 7642 (1992); the New Mexico Air Quality Control Act, Article 2, NMSA 1978 ('the Act'); either the Albuquerque Joint Air Quality Control Board Ordinance, Chapter 9, Article 5, Part 1, ROA 1994 ('the Ordinance') or the Bernalillo County Joint Air Quality Control Board Ordinance No. 94-5 ('the Ordinance'); and Albuquerque/Bernalillo County Air Quality Control Board Regulations, Title 20, Chapter 11, New Mexico Administrative Code ('the Regulations'). The Environmental Health Department is authorized by the City of Albuquerque ('the City'), the County of Bernalillo ('the County'), and the Albuquerque/Bernalillo County Air Quality Control Board ('the Board') to be the administrative and enforcement agency for the Board. Jurisdiction over Federal lands and facilities within Bernalillo County is granted to the City of Albuquerque and Bernalillo County by 42 USCA 7401 (a) (3), 42 USCA 7418 (a), and Executive Order No. 12088 (1978), as amended by Executive Order No. 12580 (1987).

**I. PERMIT CONDITIONS AND TERMS**

As authorized by 20.11.21 NMAC, Open Burning ('Regulation') a Permit has been CONDITIONALLY APPROVED to conduct the open burning or detonation activities as stated in the attached application and consistent with the following conditions and terms:

**Condition No. 1**

The open burn or detonation will be conducted in the manner stated and at the following location: Kirtland AFB as indicated in the attached application dated 12/12/2013 and received by the Air Quality Division ('Division') 12/12/2013. The events involve up to 2000 lbs of Explosives and will occur between 1/1/2014 and 12/31/2014.

**Condition No. 2**

Every reasonable effort will be made to minimize air contaminants.

**Condition No. 3**

As required by 20.11.21.200.A(4) NMAC and 20.11.21.200.D NMAC, this Permit will be suspended during a 'no burn' period, or in the event of current or prospective exceedences of the federal ambient air quality standards as determined by the Director of the City Environmental Health Department ('Director'). Call (505) 768-1930 for current notifications.

**Condition No. 4**

At least 24-hours prior to the anticipated open burn or detonation fax a notice to (505)768-1977 Attn: Open Burn Program and email the Department at [jstonesifer@cabq.gov](mailto:jstonesifer@cabq.gov) and [AQD@cabq.gov](mailto:AQD@cabq.gov). If unforeseen or emergency conditions dictate that a less than 24-hour notification is required, fax a notice to (505)768-1977 and email the department at [jstonesifer@cabq.gov](mailto:jstonesifer@cabq.gov) and [AQD@cabq.gov](mailto:AQD@cabq.gov). In addition call (505) 767-5624, and provide the following information:

1. Company or agency name
2. Contact name and phone number
3. Type of activity
4. Permit number
5. Anticipated date and times for the open burn or detonation, or cancellation of the permitted activity, if notification was made
6. Anticipated duration of the burn.

**Condition No. 5**

In accordance with 20.11.21.12 NMAC, burning of environmentally poor burning substances, as defined in 20.11.21.7.K NMAC, is strictly prohibited in Bernalillo County.

**Additional Terms**

1. This Permit may be revoked if the Permittee fails to comply with 20.11.21 NMAC, Open Burning ('Regulation') or the conditions and terms of the permit.
2. The issuance of this Permit does not relieve the Permittee from the responsibility of complying with the provisions of the Air Quality Control Act, and the laws and regulations in force pursuant to the Act as well as responsibility of Permittee to notify local fire authorities before igniting the burn.
3. Any conditions as part of this Permit shall be enforceable to the same extent as a regulation of the Board.
4. Whenever two or more parts of the Air Quality Control Act, or the laws and regulations in force pursuant to the Act, limit, control or regulate the emissions of a particulate air contaminant, the more restrictive or stringent shall govern.
5. Any records, reports, or information obtained by the Department shall be available to the public, except upon the Department's satisfactory showing that the records, reports, or information, or particular parts thereof would divulge confidential business records, methods, or processes entitled to protection as a trade secret, or protected by any other state or federal law or regulation. However, emission data will not be treated as confidential information. Confidential information may be disclosed to any officer, employee or authorized representative of the Department, the New Mexico Environment Department, or United States Environmental Protection Agency, or during any relevant proceeding under the Regulations, the Air Quality Control Act or the federal Clean Air Act (Act), if appropriate.
6. The Department may conduct scheduled and unscheduled inspections ensure compliance with the Regulation and Permit; and, upon presentation of proper identification and credentials, the Department shall have:
  - a. Right of entry to any premises where an emission source, monitoring equipment, or records are located; and
  - b. Access to and copy any records required to be established and maintained by this Regulation or Permit.
7. All correspondence, telephone calls, fax or emails concerning this Permit shall be addressed to:

Open Burn Program  
Air Quality Division  
1 Civic Plaza, Room 3047  
P.O. Box 1293  
Albuquerque, NM 87103  
(505) 768-1972 Phone (505) 768-1977 Fax

8. If any part of Regulation or Permit is held to be invalid or unenforceable, the holding will not affect the validity or enforceability of any other part of the Regulation or Permit as long as the remainder of the Regulation or Permit is reasonably capable of completion.

9. This Permit shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico, and the laws, rules, and regulations of the City of Albuquerque.

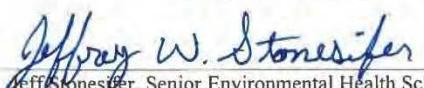
10. By accepting this Permit, the Permittee acknowledges having thoroughly read this Permit, and has sought and received whatever competent advice or counsel was necessary to form a full and complete understanding of all rights and obligations herein.

11. This Permit shall be in effect for one year from the date of issuance unless effective dates are stated in Condition No. 1.

12. Non-compliance of any condition or term in this permit is a violation of the permit.

13. In accordance with the 1991 Uniform Fire Code Section 11.203.g, burning material shall be constantly attended by a person knowledgeable in the use of the fire-extinguishing equipment required by Section 11.203.f and familiar with the permit limitations which restrict open burning. An attendant shall supervise the burning material until the fire has been extinguished.

Issued on the 17<sup>th</sup> day of Dec, 2013

  
Jeff Stonerifer, Senior Environmental Health Scientist  
Open Burn Program, Air Quality Division  
City of Albuquerque Environmental Health Department



City of Albuquerque  
Environmental Health Department  
Air Quality Division

*All Quality Division*  
11850 Sunset Gardens S.W., Albuquerque, New Mexico 87121  
Phone: (505) 768-1972 Fax: (505) 768-1977



**Multiple or Single Event Open Burn Permit Form  
(Conditionally Allowed)**

This form shall be filled out completely by a person seeking a multiple or single event open burn permit for the purposes described in 20.11.21.13.A NMAC, Table I. Please sign and send the completed application to the address above, or fax to (505) 768-1977, or send via email with electronic signature to [gdingman@cabq.gov](mailto:gdingman@cabq.gov) and [jstonesifer@cabq.gov](mailto:jstonesifer@cabq.gov). **This form shall be received by the Air Quality Division at least five (5) business days in advance of the event.** (Use additional sheets as necessary)

Date(s) the burn will be conducted: January 1, 2014-December 31, 2014 Submittal Date:

**Date received by Air Quality Division:**

1. Requester's Agency (If Applicable): USAF, Kirtland AFB  
2. Requester's Name: Tom D. Miller, Colonel Requester's Title: Installation Commander  
3. Mailing Address: 2050 Wyoming Blvd, SE Kirtland AFB, NM 87117  
4. Requester's Telephone Number: 505-846-8546  
5. Requester's Fax Number: 505-853-6970 Email: john.pike@kirtland.af.mil

6. Location where burning is to be conducted:

**Physical Address:** Kirtland Air Force Base approved detonation ranges

Please check one:

- City of Albuquerque       Village of Los Ranchos       Village of Tijeras  
 Village of Alameda       Bernalillo County (Unincorporated)

7. Type of ignitable material: Waste Explosives, High Explosives, C4 (< 2000 lbs per event)  
Type of fuel:

8. Description of method to ignite burn:  
Explosive

**9. Descriptions of method to maintain, control, and terminate burn:  
Physical Containment**

10. Why is the burn necessary?

**Research and development, testing, training, and munitions treatment**

11. Have alternatives instead of burning been considered?  Yes  No  
If yes, please list the alternatives and describe why they were not chosen.

Please check the appropriate box characterizing whether this open burn is for a **single or multiple event** and check the appropriate box under the single event or multiple events which best describes the purpose or conditions for the burn event for which the permit is being requested.

**Single Event Open Burn**

- Timber and forest management for burns  $\frac{1}{4}$  acre through 10 acres in size, or up to 1,000 cubic feet of pile volume per day
- Disease control of dead animals and plants
- Research and development activities for burns of 2,000 gallons or more liquid fuel or 5,000 pounds or more of solid fuel
- Above ground detonation of more than 200 pounds of explosives
- Ignition of rocket motors containing more than 8,000 pounds of fuel
- Hot torch burning of weeds, please specify,
  - Ditch  Channel  Public right of way  Other public property
- Agricultural burning for burns  $\frac{1}{4}$  acre through 10 acres in size, or up to 1,000 cubic feet of pile volume per day
- Any special condition which would otherwise be prohibited for which there is an unusual need where burning would best serve the public interest overall

**Multiple Event Open Burn**

- Timber and forest management
- Research and development activities
- Disposal by burning of explosives to avoid hazards of transport or handling
- Above ground detonation of more than 20 pounds of explosives
- Ignition of rocket motors containing more than 4,000 pounds of fuel
- Fire fighter and rescue training
- Hot torch burning of weeds, please specify,
  - Ditch  Channel  Public right of way  Other public property
- Agricultural burning for burns  $\frac{1}{4}$  acre through 10 acres in size, or up to 1,000 cubic feet of pile volume per day

**12. MULTIPLE BURN EVENTS ONLY:**

13. Is this request for permit renewal approval?  Yes  No  
If yes, what was the number of similar fires conducted during the previous permit cycle?

~250 events

Describe the character of similar fires conducted during the previous permit cycle:

Open detonations that were less than 2000 lbs

If not requesting renewal of permit, what is the estimated number of fires to be conducted?

Please describe the character of the fires to be conducted: Same as the previous year, small scale detonations conducted on approved ranges

What is the schedule of fires to be conducted? No fixed schedule

**Certification:**

I understand that by applying for this Open Burn Permit does not relieve me of the responsibility of contacting my local fire department or other authorities and obtaining all necessary permits and/or approvals prior to the event.

Tom D. Miller  
Signature

26 Nov 13  
Date

"NOTICE TO INDIVIDUALS WITH DISABILITIES: If you have a disability and/or require special assistance to participate in this process, please call (505) 768-2600 and special assistance will be made available to you. TTY users may request special assistance by calling the above number through the New Mexico Relay at 1-800-659-8331."

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**APPENDIX D**

**APPLICABLE LAWS, REGULATIONS, POLICIES, AND  
PLANNING CRITERIA**



## Appendix D

### Applicable Laws, Regulations, Policies, and Planning Criteria

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When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. In addition to the National Environmental Policy Act (NEPA), there are other environmental laws and Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

*NOTE: This is not a complete list of all applicable laws, regulations, policies, and planning criteria potentially applicable to documents, however, it does provide a general summary for use as a reference.*

#### **Airspace Management**

Airspace management procedures assist in preventing potential conflicts or accidents associated with aircraft using designated airspace in the United States, including restricted military airspace. Airspace management involves the coordination, integration, and regulation of the use of airspace. The Federal Aviation Administration (FAA) has overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and air traffic control procedures. All military and civilian aircraft are subject to Federal Aviation Regulations. The FAA's *Aeronautical Informational Manual* defines the operational requirements for each of the various types or classes of military and civilian airspace.

Some military services have specific guidance for airspace management. For example, airspace management in the U.S. Air Force (USAF) is guided by Air Force Instruction (AFI) 13-201, *Air Force Airspace Management*. This AFI provides guidance and procedures for developing and processing special use airspace. It covers aeronautical matters governing the efficient planning, acquisition, use, and management of airspace required to support USAF flight operations. It applies to activities that have operational or administrative responsibility for using airspace, establishes practices to decrease disturbances from flight operations that might cause adverse public reaction, and provides flying unit commanders with general guidance for dealing with local problems. The U.S. Army, per Army Regulation (AR) 95-2, *Airspace, Airfields/Heliport, Flight Activities, Air Traffic Control and Navigational Aids*, provides similar guidance and procedures for U.S. Army airspace operations.

#### **Noise**

Federal, state, and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978, requires compliance with state and local noise laws and ordinances.

The U.S. Department of Housing and Urban Development (HUD), in coordination with the Department of Defense (DOD) and the FAA, has established criteria for acceptable noise levels for aircraft operations relative to various types of land use.

The U.S. Army, through AR 200-1, *Environmental Protection and Enhancement*, implements federal laws concerning environmental noise from U.S. Army activities. The USAF's Air Installation Compatible Use Zone (AICUZ) Program, (AFI 32-7063), provides guidance to air

bases and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near USAF installations.

## Land Use

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activities occurring on a defined parcel of land. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories.

Land use planning in the USAF is guided by *Land Use Planning Bulletin, Base Comprehensive Planning* (HQ USAF/LEEVX, 1 August 1986). This document provides for the use of 12 basic land use types found on a USAF installation. In addition, land use guidelines established by the HUD and based on findings of the Federal Interagency Committee on Noise are used to recommend acceptable levels of noise exposure for land use. The U.S. Army uses the 12 land use types for installation land use planning, and these land use types roughly parallel those employed by municipalities in the civilian sector.

## Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation's air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQS) that regulate carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to utilize financial and technical assistance and leadership from the Federal Government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by the USEPA as being in attainment or nonattainment for pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCRs). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassified. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction and long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a federal agency could also be subject to USEPA's Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives federal immunity from complying with the CAA and states all federal agencies will comply with all federal- and state-approved requirements.

The General Conformity Rule requires that any federal action meet the requirements of a State Implementation Plan or Federal Implementation Plan. More specifically, CAA conformity is ensured when a federal action does not cause a new violation of the NAAQS; contribute to an

increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to federal actions that are considered “regionally significant” or where the total emissions from the action meet or exceed the *de minimis* thresholds presented in 40 Code of Federal Regulations (CFR) §93.153. If a federal action does not meet or exceed the *de minimis* thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

On 13 May 2010, the USEPA issued the Greenhouse Gas (GHG) Tailoring Rule that sets thresholds for GHG emissions from large stationary sources. The new GHG emissions thresholds for large stationary sources define when permits under the New Source Review Prevention of PSD and Title V Operating Permit programs are required for new and existing industrial facilities. Beginning 2 January 2011, large industrial facilities that have CAA permits for non-GHG emissions must also include GHGs in these permits. Beginning 1 July 2011, all new construction or renovations that increase GHG emissions by 75,000 tons of carbon dioxide or equivalent per year or more will be required to obtain construction permits for GHG emissions. Operating permits will be needed by all sources that emit GHGs above 75,000 tons of carbon dioxide or equivalent per year beginning in July 2011.

## Health and Safety

Human health and safety relates to workers’ health and safety during demolition or construction of facilities, or applies to work conditions during operations of a facility that could expose workers to conditions that pose a health or safety risk. The federal Occupational Safety and Health Administration (OSHA) issues standards to protect persons from such risks, and the DOD and state and local jurisdictions issue guidance to comply with these OSHA standards. Safety also can refer to safe operations of aircraft or other equipment.

AFI 91-202, *USAF Mishap Prevention Program*, implements Air Force Policy Directive 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information.

U.S. Army regulations in AR 385-10, *Army Safety Program*, prescribe policy, responsibilities, and procedures to protect and preserve U.S. Army personnel and property from accidental loss or injury. AR 40-5, *Preventive Medicine*, provides for the promotion of health and the prevention of disease and injury.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (23 April 1997), directs federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Federal agencies must also ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks.

## Geology and Soil Resources

Recognizing that millions of acres per year of prime farmland are lost to development, Congress passed the Farmland Protection Policy Act (FPPA) to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland (7 CFR

Part 658). Prime farmland is described as soils that have a combination of soil and landscape properties that make them highly suitable for cropland, such as high inherent fertility, good water-holding capacity, and deep or thick effective rooting zones, and that are not subject to periodic flooding. Under the FPPA, agencies are encouraged to conserve prime or unique farmlands when alternatives are practicable. Some activities that are not subject to the FPPA include federal permitting and licensing, projects on land already in urban development or used for water storage, construction for national defense purposes, or construction of new minor secondary structures such as a garage or storage shed.

## Water Resources

The Clean Water Act (CWA) of 1977 is an amendment to the federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into United States' waters. The CWA requires USEPA to establish water quality standards for specified contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers. Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

The Coastal Zone Management Act (CZMA) of 1972 declares a national policy to preserve, protect, and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone refers to the coastal waters and the adjacent shorelines, including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, including the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone through the development of land and water use programs in cooperation with federal and local governments. States may apply for grants to help develop and implement management programs to achieve wise use of the land and water resources of the coastal zone. Under Section 307, federal agency activities that affect any land or water use or natural resource of a coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the state's coastal management program.

The Safe Drinking Water Act (SDWA) of 1974 establishes a federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new federal enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set current federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

The Wild and Scenic Rivers Act of 1968 provides for a wild and scenic river system by recognizing the remarkable values of specific rivers of the Nation. These selected rivers and their immediate environment are preserved in a free-flowing condition, without dams or other construction. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by an Act of Congress, an act of state legislature, or by the Secretary of the Interior upon the recommendation of the governor of the state(s) through which the river flows.

EO 11988, *Floodplain Management* (24 May 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted floodproofing and flood protection to include elevating structures above the base flood level rather than filling in land.

EO 11990, *Protection of Wetlands* (24 May 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (5 October 2009), directed the USEPA to issue guidance on Section 438 of the Energy Independence and Security Act (EISA). The EISA establishes into law new storm water design requirements for federal construction projects that disturb a footprint of greater than 5,000 square feet of land. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate storm water retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses will be conducted to evaluate the effectiveness of the as-built storm water reduction features. These regulations are applicable to DOD Unified Facilities Criteria. Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

EO 13514 also requires federal agencies to improve water efficiency and management by reducing potable water consumption intensity by 2 percent annually, or by 26 percent, by Fiscal Year (FY) 2020, relative to a FY 2007 baseline. Furthermore, federal agencies must also reduce agency industrial, landscaping, and agricultural water consumption by 2 percent annually, or 20 percent, by FY 2020, relative to a FY 2010 baseline.

EO 13547, *Stewardship of the Ocean, Our Coasts, and the Great Lakes* (19 July 2010), establishes a national policy to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources; enhance the sustainability of ocean and coastal economies; preserve our maritime heritage; support sustainable uses and access; provide for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification; and coordinate with our national security and foreign policy interests.

## Biological Resources

The Endangered Species Act (ESA) of 1973 establishes a federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species that can be obtained by calling the appropriate state Fish and Wildlife office. Some species also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess; offer to or sell, barter, purchase, or deliver; or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport, or carry from one state, territory, or district to another; or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

The Sikes Act (16 United States Code [USC] §§670a–670o, 74 Stat. 1052), as amended, Public Law (PL) 86-797, approved 15 September 1960, provides for cooperation by the Departments of the Interior and Defense with state agencies in planning, development, and maintenance of fish and wildlife resources on military reservations throughout the United States. In November 1997, the Sikes Act was amended via the Sikes Act Improvement Amendment (PL 105-85, Division B, Title XXIX) to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate this program, the amendments require the Secretaries of the military departments to prepare and implement Integrated Natural Resources Management Plans

(INRMPs) for each military installation in the United States unless the absence of significant natural resources on a particular installation makes preparation of a plan for the installation inappropriate. INRMPs must be reviewed by the USFWS and applicable states every 5 years. The National Defense Authorization Act of 2004 modified Section 4(a)(3) of the ESA to preclude the designation of critical habitat on DOD lands that are subject to an INRMP, if the Secretary of the Interior determines in writing that such a plan provides a benefit to the species for which critical habitat is proposed for designation.

EO 11514, *Protection and Enhancement of Environmental Quality* (5 March 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 13112, *Invasive Species* (3 February 1999), provides direction to use relevant programs and authorities to prevent introduction of invasive species, detect and respond rapidly to control populations of invasive species, monitor invasive species populations, provide restoration of native species and habitat conditions in ecosystems that have been invaded, conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species, and promote public education on invasive species with means to address them. EO 13112 was created to minimize the economic, ecological, and human health impacts that invasive species cause.

EO 13186, *Conservation of Migratory Birds* (10 January 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal Government. EO 13186 provides a specific framework for the Federal Government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

## Cultural Resources

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the religious use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and American Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (AChP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). The AChP advises the President, Congress, and federal agencies on historic preservation issues. Section 106 of the NHPA directs federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 106 of the act is implemented by regulations of the AChP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions that qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The Native American Graves Protection and Repatriation Act of 1990 establishes rights of American Indian tribes to claim ownership of certain "cultural items", defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by federal agencies. Cultural items discovered on federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on federal or tribal land must be reported to the appropriate American Indian tribe and the federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (13 May 1971), directs the Federal Government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all federal sites under their jurisdiction or control that might qualify for listing on the NRHP. Agencies must allow the AChP to comment on the alteration, demolition, sale, or transfer of property that is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

EO 13007, *Indian Sacred Sites* (24 May 1996), provides that agencies managing federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American Indian religious practitioners' access to and ceremonial use of

American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13175, *Consultation and Coordination with Indian Tribal Governments* (6 November 2000), was issued to provide for regular and meaningful consultation and collaboration with Native American tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Native American tribes. EO 13175 recognizes the following fundamental principles: Native American tribes exercise inherent sovereignty over their lands and members, the United States government has a unique trust relationship with Native American tribes and deals with them on a government-to-government basis, and Native American tribes have the right to self-government and self-determination.

EO 13287, *Preserve America* (3 March 2003), orders federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal Government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

## Socioeconomics and Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (11 February 1994), directs federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations, and develop agencywide environmental justice strategies. The strategy must list "programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations". A copy of the strategy and progress reports must be provided to the federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each federal agency.

## Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a federal "Superfund" to respond to emergencies immediately. Although the "Superfund" provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters. Section 120(h) of CERCLA requires federal agencies to notify prospective buyers of contaminated federal properties about the type, quantity, and location of hazardous substances that would be present.

The Pollution Prevention Act of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes; redesigning products; substituting raw materials; and making improvements in management techniques, training, and inventory control. Consistent with pollution prevention principles, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (24 January 2007 [revoking EO 13148]), sets a goal for all federal agencies to promote environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and use of paper of at least 30 percent post-consumer fiber content. In addition, EO 13423 sets a goal that requires federal agencies to ensure that they reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of; increase diversion of solid waste, as appropriate; and maintain cost-effective waste prevention and recycling programs at their facilities. Additionally, in *Federal Register* Volume 58 Number 18 (29 January 1993), CEQ provides guidance to federal agencies on how to “incorporate pollution prevention principles, techniques, and mechanisms into their planning and decisionmaking processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA”.

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for “cradle-to-grave” management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive, toxic, or listed by USEPA as being hazardous. With the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA strengthens control of both hazardous and nonhazardous waste and emphasizes the prevention of pollution of groundwater.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards and authorizes USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the Emergency Planning and Community Right to Know Act, which requires facility operators with “hazardous substances” or “extremely hazardous substances” to prepare comprehensive emergency plans and to report accidental releases. If a federal agency acquires a contaminated site, it can be held liable for cleanup as the property owner/operator. A federal agency can also incur liability if it leases a property, as the courts have found lessees liable as “owners”. However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it can claim the “innocent purchaser” defense under CERCLA. According to Title 42 USC §9601(35), the current owner/operator must show it undertook “all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice” before buying the property to use this defense.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorized USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singled out polychlorinated biphenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and could cause adverse health effects in humans. TSCA and its regulations govern the manufacture, processing, distribution, use,

marking, storage, disposal, clean-up, and release reporting requirements for numerous chemicals like PCBs. TSCA Title II provides statutory framework for "Asbestos Hazard Emergency Response", which applies only to schools. TSCA Title III, "Indoor Radon Abatement", states indoor air in buildings of the United States should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, "Lead Exposure Reduction", directs federal agencies to "conduct a comprehensive program to promote safe, effective, and affordable monitoring, detection, and abatement of lead-based paint and other lead exposure hazards". Further, any federal agency having jurisdiction over a property or facility must comply with all federal, state, interstate, and local requirements concerning lead-based paint.

## Energy

The Energy Policy Act (EPAct) of 2005, PL 109-58, amended portions of the National Energy Conservation Policy Act and established energy management goals for federal facilities and fleets. Section 109 of EPAct directs that new federal buildings (commercial or residential) be designed 30 percent below American Society of Heating, Refrigerating, and Air-Conditioning Engineers standards or the International Energy Code. Section 109 also includes the application of sustainable design principles for new buildings and requires federal agencies to identify new buildings in their budget requests that meet or exceed the standards. Section 203 of EPAct requires that all federal agencies' renewable electricity consumption meet or exceed 3 percent from FY 2007 through FY 2009, with increases to at least 5 percent in FY 2010 through FY 2012 and 7.5 percent in FY 2013 and thereafter. Section 203 also establishes a double credit bonus for federal agencies if renewable electricity is produced onsite at a federal facility, on federal lands, or on Native American lands. Section 204 of EPAct establishes a photovoltaic energy commercialization program for federal buildings.

EO 13514, *Federal Leadership In Environmental, Energy, And Economic Performance* (5 October 2009), directs federal agencies to improve water use efficiency and management; implement high performance sustainable federal building design, construction, operation and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its GHG emissions, water use, pollution prevention, regional development and transportation planning, sustainable building design and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for federal Leadership in High Performance and Sustainable Buildings. The CEQ regulations at 40 CFR §1502.16(e) directs agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Section 503(b) of EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, instructs federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. EO 13423 sets goals in energy efficiency, acquisition, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. Sustainable design measures such as the use of "green" technology (e.g., photovoltaic panels, solar collection, heat recovery systems, wind turbines, green roofs, and habitat-oriented storm water management) would be incorporated where practicable.

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## **APPENDIX E**

**INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR  
ENVIRONMENTAL PLANNING AND PUBLIC INVOLVEMENT MATERIALS**



## Appendix E

### Interagency and Intergovernmental Coordination for Environmental Planning Materials

The 377 ABW and DTRA solicited comments on the Draft Environmental Assessment (EA) by distributing letters (example follows) to potentially interested federal, state, and local agencies; Native American tribes; and other stakeholder groups or individuals. The following is a list of potentially interested parties:

#### **Federal, State, and Local Agencies – Scoping Letters**

Dr. Benjamin Tuggle, Regional Director  
U.S. Fish and Wildlife Service  
Southwest Regional Office  
500 Gold Avenue SW  
Albuquerque NM 87102

Mr. Josh Sherman, District Conservationist  
National Resources Conservation Service  
Albuquerque Service Center  
6200 Jefferson NE, Room 125  
Albuquerque NM 87109

Ms. Julie Alcon  
Chief of Environmental Resources Section  
US Army Corps of Engineers  
4101 Jefferson Plaza NE  
Albuquerque NM 87109

Mr. Ed Singleton, District Manager  
Bureau of Land Management  
New Mexico State Office  
Albuquerque District Office  
435 Montaño Road NE  
Albuquerque NM 87107

Ms. Peg Sorenson  
Southwestern Region NEPA Coordinator  
US Forest Service  
Ecosystem Analysis and Planning, Watershed,  
and Air Management  
333 Broadway Boulevard SE  
Albuquerque NM 87102

The Honorable Tom Udall

United States Senate

219 Central Avenue NW, Suite 120

Albuquerque NM 87102

Mr. Morgan Nelson  
Office of Planning and Performance  
New Mexico Environmental Department  
1190 St. Francis Drive, Suite N4050  
Santa Fe NM 87505

The Honorable Martin Heinrich

United States Senate

625 Silver Avenue SW, Suite 130

Albuquerque NM 87102

Mr. Matt Wunder, Chief  
Conservation Services  
New Mexico Department of Game and Fish  
1 Wildlife Way  
Santa Fe NM 87507

Mr. Bill Walker, Regional Director  
Bureau of Indian Affairs  
Southwest Regional Office  
1001 Indian School Road NW  
Albuquerque NM 87104

Ms. Mary Lou Leonard, Director  
City of Albuquerque Environmental Health  
Department  
400 Marquette NW  
Albuquerque NM 87102

Mr. Ken Hughes  
Local Government Division  
State Single Point of Contact  
Bataan Memorial Building  
407 Galisteo Street, Room 201  
Santa Fe NM 87501

Mr. Ron Curry, Regional Administrator  
U.S. Environmental Protection Agency,  
Region 6  
1445 Ross Avenue, Suite 1200  
Dallas TX 75202

The Honorable Steve Pearce  
United States House of Representatives  
3445 Lambros Loop NE  
Los Lunas NM 87031

Mr. Jeff M. Witte, Director/Secretary  
New Mexico Department of Agriculture  
3190 S. Espina  
Las Cruces NM 88003

Cabinet Secretary John Bemis  
New Mexico Energy, Minerals, and Natural  
Resources Department  
1220 South St. Francis Drive  
Santa Fe NM 87505

Commissioner Ray Powell  
Commissioner of Public Lands  
New Mexico State Land Office  
310 Old Santa Fe Trail  
Santa Fe NM 87501

The Honorable Ben Lujan  
United States House of Representatives  
811 St. Michael's Drive, Suite 104  
Santa Fe NM 87505

The Honorable Michelle Lujan Grisham  
United States House of Representatives  
505 Marquette Avenue NW  
Albuquerque NM 87102

Ms. Barbara Baca, Director  
City of Albuquerque Parks and Recreation  
Department  
1801 4th Street NW  
Albuquerque NM 87102

Ms. Suzanne Lubar, Director  
City of Albuquerque Planning Department  
Plaza del Sol  
600 Second Street  
Albuquerque NM 87102

Councilors  
Albuquerque City Council  
One Civic Plaza, NW  
9th Floor, Room 9087  
Albuquerque NM 87102

Ms. Sue Hansen Putze, Project Manager  
Ciudad Soil and Water Conservation District  
6200 Jefferson NE, Room 125  
Albuquerque NM 87109

Bernalillo County Water Resources Program  
2400 Broadway SE, Building N  
Albuquerque NM 87102

Bernalillo County Open Space  
111 Union Square SE, Suite 200  
Albuquerque NM 87102

Bernalillo County Parks and Recreation  
111 Union Square SE  
Albuquerque NM 87102

Bernalillo County Zoning, Building and  
Planning Department  
111 Union Square SE, Suite 100  
Albuquerque NM 87102

Bernalillo County Environmental Health Office  
111 Union Square SE, Suite 300  
Albuquerque NM 87102

Commissioners  
Bernalillo County Board of Commissioners  
One Civic Plaza NW  
Albuquerque NM 87102

Board of Directors  
Mid Region Council of Governments  
809 Copper Avenue NW  
Albuquerque NM 87102

Mr. Jeff Robins  
NNSA Service Center/Albuquerque  
KAFB East, Building 401  
P.O. Box 5400  
Albuquerque NM 87185

Mr. Tim Tandy  
Federal Aviation Administration  
ASW-640  
2601 Meachum Boulevard  
Ft. Worth TX 76137

Dr. Jeff Pappas, PhD.  
State Historic Preservation Officer  
Department of Cultural Affairs  
Historic Preservation Division  
Bataan Memorial Building  
407 Galisteo Street, Suite 236  
Santa Fe NM 87501

**Example Scoping Letter**

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 377TH AIR BASE WING (AFMC)

Colonel John C. Kubinec  
377ABW/CC  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB NM 87117-5000

The Honorable Steve Pearce  
United States House of Representatives  
3445 Lambros Loop NE  
Los Lunas NM 87031

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (IICEP) for the Defense Threat Reduction Agency's (DTRA) Proposed Testing and Associated Training Use of the Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland Air Force Base; Bernalillo County, New Mexico.**

Dear Representative Pearce

The Defense Threat Reduction Agency (DTRA) at Kirtland Air Force Base (KAFB), Bernalillo County, New Mexico is preparing an Environmental Assessment (EA) addressing the physical, environmental, cultural, and socioeconomic effects of proposed ongoing and enhanced testing and associated training use of the approximately 155-acre Giant Reusable Air Blast Simulator (GRABS) Site for explosives testing. The GRABS Site, in operation since 1971, has an existing limit of 1,000 pounds of TNT equivalent for a variety of explosive testing scenarios. The GRABS Site is located within the greater boundaries of KAFB (see Figure 1).

In 1993, DTRA completed an EA addressing activities performed and proposed at the GRABS Site. Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the Air Force NEPA regulation (32 CFR Part 989). No complaints from the public have been received due to any explosives or other testing conducted at the GRABS Site.

Given the length of time that has elapsed since the 1993 EA, DTRA and the U.S. Air Force have determined that a new, current EA is appropriate. This new EA will assess ongoing and enhanced testing and associated training activities at the GRABS Site, using current environmental data and current testing terminology, which may have changed over the course of the last 19 years. However, the maximum limit of 1,000 pounds of TNT equivalent at the Site would NOT change. DTRA would continue to follow and implement existing health and safety plans, including the GRABS Explosives Site Plan (ESP) and the Health and Safety Risk Analysis (HASRA); these plans will be discussed in the EA. The EA will describe ongoing testing and associated training activities at the Site, as well as any reasonably foreseeable future activities at the Site.

The locations of the GRABS Site and existing facilities and features are shown on the attached Figure 1.

The current EA is being prepared in accordance with the NEPA of 1969, CEQ regulations implementing NEPA, and the US Air Force NEPA regulation. This EA will evaluate the potential impacts of the proposed action and alternatives, to include the no-action alternative, on humans and the natural environment.

If you have additional information regarding impacts of the proposed action to the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. We look forward to and welcome your participation in this NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIE, 2050 Wyoming Boulevard SE, Suite 126, Kirtland AFB NM 87117, or via email to [nepa@kirtland.af.mil](mailto:nepa@kirtland.af.mil).

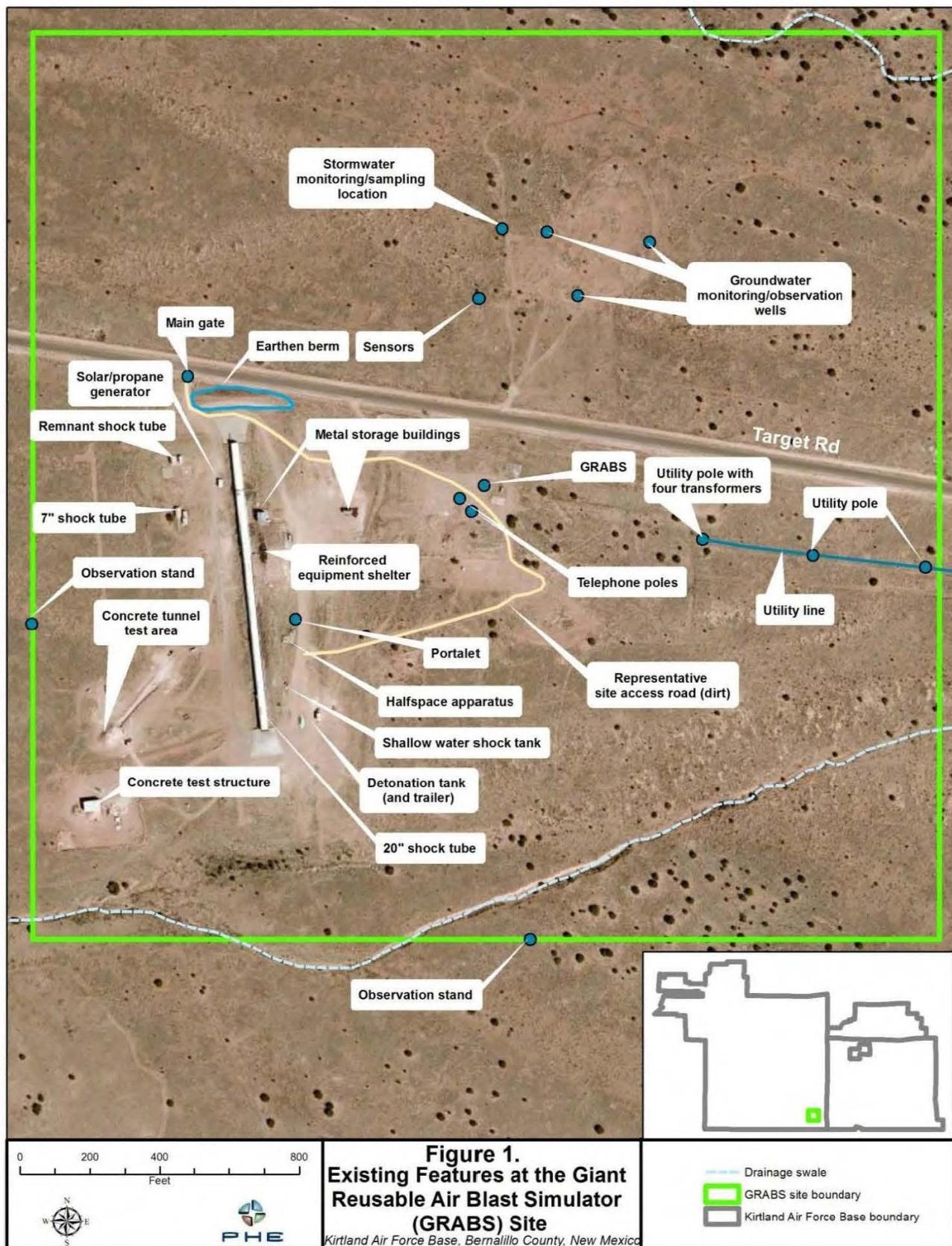
Sincerely



JOHN C. KUBINEC, Colonel, USAF  
Commander

Attachment:

Figure 1. GRABS Site - Site Location and Existing Features



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**Agency Scoping Letter Responses:**

**From:** [Grant P Brodehl](#)  
**To:** [377 MSG/CFAN NEPA Environmental Assessment](#)  
**Subject:** IICEP/DTRA/GRABS  
**Date:** Friday, April 05, 2013 6:02:42 PM  
**Attachments:** Scanned from a Xerox multifunction device001.pdf

---

To Whom It May Concern:

Bernalillo County Open Space has no comment on the proposed action attached to this email.

Sincerely,

Grant Brodehl

Sr. Park, Open Space and Trail Planner

Bernalillo County Parks and Recreation Dept.

**From:** Sorensen, Peg -FS  
**To:** 377 MSG/CEAN NEPA Environmental Assessment  
**Subject:** Environmental Reviews  
**Date:** Thursday, April 11, 2013 1:43:31 PM

---

Thank you for the opportunity to participate and comment on several of the Air Force's projects.

The US Forest Service does not have concerns or comments regarding the 24-acre Technical Evaluation Assessment Monitor Site (TEAMS).

The US Forest Service does not have concerns or comments regarding the 155 Giant Reusable Air Blast Simulator Site (GRABS).

**We appreciate your efforts to keep us informed of projects with potential impacts Federal Resources managed by the National Forest Service.**

Peg Sorensen, Regional Environmental Coordinator (NEPA)  
Southwestern Region, USDA Forest Service  
333 Broadway Blvd. SE  
Albuquerque, NM 87102 505-842-3256

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GOVERNOR  
Susana Martinez



**STATE OF NEW MEXICO  
DEPARTMENT OF GAME & FISH**

DIRECTOR AND SECRETARY

TO THE COMMISSION

James S. Lane, Jr.

Daniel E. Brooks, Deputy Director

One Wildlife Way  
Santa Fe, NM 87507  
Post Office Box 25112  
Santa Fe, NM 87504  
Phone: (505) 476-8008  
Fax: (505) 476-8123

Visit our website at [www.wildlife.state.nm.us](http://www.wildlife.state.nm.us)  
For information call: (888) 248-6866

**STATE GAME COMMISSION**

SCOTT BIDEAGAIN  
Chairman  
Tucumcari, NM

THOMAS "DICK" SALOPEK  
Vice-Chairman  
Las Cruces, NM

DR. TOM ARVAS  
Albuquerque, NM

ROBERT ESPINOZA, SR.  
Farmington, NM

PAUL M. KIENZLE III  
Albuquerque, NM

BILL MONTOYA  
Alto, NM

April 8, 2013

NEPA Program Manager  
377 MSG/CEIE  
2050 Wyoming Blvd. SE, Suite 126  
Kirtland AFB, NM 87117

*Defense Threat Reduction Agency Giant Reusable Air Blast Simulator Draft Environmental Impact Statement Scoping, Kirtland Air Force Base; NMDGF Doc. No. 15570*

Dear Sirs:

The Department of Game and Fish (Department) has reviewed your 25 March 2013 scoping letter regarding the above-referenced project. The Department does not anticipate adverse effects to wildlife or important wildlife habitats from authorization of this project.

We appreciate the opportunity to comment on this project, and look forward to reviewing the draft environmental assessment. Should you have any questions regarding these comments, please contact Mark Watson, Habitat Specialist at (505) 476-8115 or [mark.watson@state.nm.us](mailto:mark.watson@state.nm.us).

Sincerely,

A handwritten signature in black ink, appearing to read "K. K. Cunningham".

Kenneth K. Cunningham  
Assistant Chief, Technical Guidance Section  
Conservation Services Division

cc: USFWS NMES Office  
Donald Auer, Habitat Manager, NMDGF  
Ellen Heilhecker, Northwest Regional Habitat Biologist, NMDGF



## Mid-Region Council of Governments

Debbie O'Malley  
 Chair, Board of Directors  
 Commissioner, Bernalillo County

April 11, 2013

Dewey V. Cave  
 Executive Director

### MEMBER GOVERNMENTS

City of Albuquerque  
 Albuquerque Public Schools  
 Albuquerque Metropolitan  
 Arroyo Flood Control  
 Authority  
 City of Belen  
 Bernalillo County  
 Town of Bernalillo  
 Village of Bosque Farms  
 Village of Corrales  
 Village of Cuba  
 Town of Edgewood  
 Village of Encino  
 Town of Estancia  
 Village of Jemez Springs  
 Village of Los Lunas  
 Los Lunas Schools  
 Village of Los Ranchos  
 de Albuquerque  
 Middle Rio Grande  
 Conservancy District  
 City of Moriarty  
 Town of Mountainair  
 Town of Peralta  
 City of Rio Rancho  
 Rio Rancho Public Schools  
 Sandoval County  
 Southern Sandoval  
 County Arroyo Flood  
 Control Authority  
 Village of Tijeras  
 Torrance County  
 Valencia County  
 Village of Willard

NEPA Program Manager  
 377 MSG/CEAIE  
 2050 Wyoming Boulevard SE Suite 126  
 Kirtland AFB NM 87117

Re: Giant Reusable Air Blast Simulator (GRABS) Site

Dear Sir:

On behalf of the Mid-Region Council of Governments (MRCOG), I would like to give my support for the Kirtland Air Force Base mission in regards to the continued operation of the GRABS Site on the base.

It is my understanding that the proposal would support ongoing testing and training activities within the boundaries of the Kirtland Air Force Base. At this time the MRCOG does not anticipate major impacts. However, as part of the Joint Land Use Study (JLUS) implementation plan, the KAFB should notify the City of Albuquerque Planning Department, the Bernalillo County Planning Department, and the Isleta Pueblo as to the GRABS Site.

The mission of the Kirtland Air Force is very important in this region and the MRCOG communities. This application for funding in no way conflicts with local or regional plans.

Please let me know if my staff or I can support you further.

Sincerely,

A handwritten signature in black ink, appearing to read "Dewey V. Cave".

Dewey V. Cave  
 Executive Director

DC/SG

809 Copper Ave. NW, Albuquerque, NM 87102  
 Phone: (505) 247-1750 Fax (505) 247-1753 Web: [www.mrcog-nm.gov](http://www.mrcog-nm.gov)



CEIE —

97233

Colonel John C. Kubinec  
377ABW/CC  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB, New Mexico 87117-5000

RECEIVED  
Bob JUL 11 2013  
HISTORIC PRESERVE

Ms. Jan Biella  
Acting State Historic Preservation Officer  
Department of Cultural Affairs  
Historic Preservation Division  
Bataan Memorial Building  
407 Galisteo Street, Suite 236  
Santa Fe, New Mexico 87501

**SUBJECT:** Section 106 Consultation for the Defense Threat Reduction Agency's (DTRA)  
Proposed Testing and Associated Training Use of the Giant Reusable Air Blast  
Simulator (GRABS) Site at Kirtland Air Force Base; Bernalillo County, New  
Mexico.

Dear Ms. Biella:

The Defense Threat Reduction Agency (DTRA) at Kirtland Air Force Base (KAFB), Bernalillo County, New Mexico is preparing an Environmental Assessment (EA) addressing the physical, environmental, cultural, and socioeconomic effects of proposed ongoing and enhanced testing and associated training use of the approximately 155-acre Giant Reusable Air Blast Simulator (GRABS) Site for explosives testing. The GRABS Site, in operation since 1971, has an existing limit of 1,000 pounds of TNT equivalent for a variety of explosive testing scenarios. The GRABS Site is located within the greater boundaries of KAFB (see Figure 1).

In 1993, DTRA completed an EA addressing activities performed and proposed at the GRABS Site. Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800, and the Air Force NEPA regulation (32 CFR Part 989). No complaints from the public have been received due to any explosives or other testing conducted at the GRABS Site.

Given the length of time that has elapsed since the 1993 EA, DTRA and the U.S. Air Force have determined that a new, current EA is appropriate. This new EA will assess ongoing and enhanced testing and associated training activities at the GRABS Site, using current environmental data and current testing terminology, which may have changed over the course of the last 19 years. However, the maximum limit of 1,000 pounds of TNT equivalent at the Site would NOT change. DTRA would continue to follow and

implement existing health and safety plans, including the GRABS Explosives Site Plan (ESP) and the Health and Safety Risk Analysis (HASRA); these plans will be discussed in the EA. The EA will describe ongoing testing and associated training activities at the Site, as well as any reasonably foreseeable future activities at the Site.

The locations of the GRABS Site and existing facilities and features are shown on the attached Figure 1.

The current EA is being prepared in accordance with the NEPA of 1969, CEQ regulations implementing NEPA, the NHPA, and the US Air Force NEPA regulation. This EA will evaluate the potential impacts of the proposed action and alternatives, to include the no-action alternative, on humans and the environment.

Pursuant to Section 106 of the NHPA and 36 CFR Part 800, DTRA and KAFB have identified and evaluated the Area of Potential Effect (APE), and have determined there is only one National Register of Historic Places (NRHP) eligible site ("historic property") located within the APE. This historic property is the World War II-era Fuze Launch Pad located to the west-northwest of the Site. This property would not be adversely affected by the proposed action, which is a continuation of existing activities that have occurred on the GRABS Site for over 40 years and have not resulted in an adverse effect to this property. All proposed ground-disturbing activities would occur on previously disturbed areas within the GRABS Site. The likelihood that previously unknown/undocumented sites will be encountered if either the proposed action or the no-action alternative is implemented is very low. Additionally, a Cultural Resources Survey of 155 Acres of the GRABS Site, Kirtland AFB, Bernalillo County, New Mexico was completed in November 1993 (University of New Mexico 1993). This survey identified no cultural resources on the GRABS Site and recommended an archaeological clearance for the Site. Thus, DTRA and KAFB have concluded that the proposed action would not adversely affect historic properties. We respectfully request that you indicate in writing whether you concur with our determination of "No Historic Properties Adversely Affected."

If your agency has additional information regarding impacts to historic properties or other environmental aspects of which we are unaware, we would appreciate receiving that information for inclusion and consideration during the NEPA process. Please forward your written comments and/or information within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Written responses should be sent to the NEPA Program Manager, 377 MSG/CEIE, 2050 Wyoming Boulevard SE, Suite 126, Kirtland AFB NM 87117, or via email to [nepa@kirtland.af.mil](mailto:nepa@kirtland.af.mil). We look forward to hearing from you in the near future.

Sincerely



JOHN C. KUBINEC, Colonel, USAF  
Commander

Attachment:

Figure 1. GRABS Site - Site Location and Existing Features

Concur with recommendations as proposed.



J. R. Ent 11-July-2013  
for NM State Historic Preservation Officer



*State of New Mexico*  
**ENVIRONMENT DEPARTMENT**

*Office of the Secretary*

SUSANA MARTINEZ  
Governor  
JOHN A. SANCHEZ  
Lieutenant Governor

Harold Runnels Building  
1190 Saint Francis Drive, PO Box 5469  
Santa Fe, NM 87502-5469  
Telephone (505) 827-2855 Fax (505) 827-2836  
[www.nmenv.state.nm.us](http://www.nmenv.state.nm.us)



RYAN FLYNN  
Cabinet Secretary-Designate  
BUTCH TONGATE  
Deputy Secretary

May 28, 2013

Colonel John C. Kubinec  
377ABW/CC  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB, NM 87117

RESPONSE BY USPS

**RE: Proposed Testing of Giant Reusable Air Blast Simulator Site at KFB**

Dear Colonel Kubinec:

Your letter regarding the above named project was received by the New Mexico Environment Department (NMED) and was sent to various bureaus for review and comment. Comments were provided from the Air Quality, Ground Water, Hazardous Waste, and Surface Water Quality Bureaus, and are as follows.

**Air Quality Bureau**

After review, the AQB determined the project takes place in Bernalillo County. The AQB does not have jurisdiction in Bernalillo County, and therefore will not provide comments.

**Ground Water Quality Bureau**

After review, the GWQB determined this document appears to be announcing that a new Environmental Assessment (EA) will be completed for testing and associated training use of the Giant Reusable Air Blast Simulator (GRABS) at Kirkland AFB. There is no information in this letter describing the facility or the activities that will be conducted; therefore there is nothing the GWQB can provide comment on at this time. The bureau will be able to provide comment once the new EA is sent out.

**Hazardous Waste Bureau**

The New Mexico Environment Department (NMED) Hazardous Waste Bureau has reviewed the Draft Environmental Assessment (EA) titled *Intergovernmental and Interagency Coordination of Environmental Planning (IICEP) for the Defense Threat Reduction Agency's (DTRA) Proposed Testing and Associated Training Use of the Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland Air Force Base; Bernalillo County, New Mexico*, dated March 25, 2013 and received on April 15, 2013. The Hazardous Waste Bureau has no comments regarding this EA.

**Surface Water Quality Bureau****Section 402**

The U.S. Environmental Protection Agency (EPA) requires National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for pollutants in stormwater discharges associated with construction activities, including clearing, grading and excavation activities from construction sites and directly related support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, etc.) that result in the disturbance of one or more acres.

If the disturbance (or re-disturbance) of this project, including support activities staging areas, and material storage areas, is one or more acres, or is part of common plan of development that is one or more acres, it will require appropriate NPDES permit coverage prior to beginning construction or disturbance.

Among other things, this permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during construction and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from the construction site) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.) and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters. For more requirements specific to New Mexico, see Part 9.4.1.1, in the 2012 CGP.

EPA requires that all "operators" (see Definitions, Appendix A in CGP) submit a Notice of Intent (NOI) prior to construction. Generally, this means that at least two parties will require permit coverage--the owner/developer and the general contractor. Each person, firm, public organization, or any other entity that meet the following criteria must file an NOI: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. It is possible that other "operators" will require appropriate NPDES permit coverage for this project.

Operators of certain small construction activity (disturbance of one to five acres) may be waived from permit requirements under limited circumstances. To be eligible for this waiver, operators must certify to EPA that they are eligible (see Section 9 Appendix C of the CGP). Waivers are only available to stormwater discharges associated with small construction activities (i.e., 1-5 acres). The size of the described proposed project activities may exclude this.

The CGP was re-issued effective February 16, 2012 (see *Federal Register / Vol. 77, No. 40 / Wednesday, February 29, 2012 / Notices, Pg 12286*). More information for the EPA's CGP, including the electronic form Notice of Intent (eNOI), and Federal Register notice can be downloaded <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>.

**Section 404/401**

The project description does not state if there will be discharge of dredged or fill material into a waterbody, including wetlands. A state Water Quality Certification is required under Section

# CITY OF ALBUQUERQUE

*Parks and Recreation Department*



April 2, 2013

Colonel John C. Kubinec  
377 ABW/CC  
2000 Wyoming Blvd. SE Suite E-3  
Kirtland AFB NM 87117-5000

Dear Colonel Kubinec:

The City of Albuquerque Parks and Recreation Department has reviewed the letter regarding the NEPA process for the Defense Threat Reduction Agency (DTRA). We see no negative impacts to the environment, our property or programs.

Thank you for the opportunity to review the request.

Sincerely,

A handwritten signature in black ink that reads "Barbara Baca".  
Barbara Baca, Director  
Parks and Recreation Department

PO Box 1293

BB224

Albuquerque

NM 87103

[www.cabq.gov](http://www.cabq.gov)

*Albuquerque - Making History 1706-2006*

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## DISTRIBUTION/MAILING LIST

### Native American Tribes – Scoping Letters

Pueblo of Isleta  
Governor E. Paul Torres  
P.O. Box 1270  
Isleta Pueblo NM 87022

Pueblo of Laguna  
Governor Richard B. Luarkie  
P.O. Box 194  
Laguna Pueblo NM 87026

Pueblo of Zuni  
Governor Arlen P. Quetawki, Sr.  
P.O. Box 339  
Zuni NM 87327

Pueblo of Picuris  
Governor Richard Mermejo  
P.O. Box 127  
Peñasco NM 87553

Jicarilla Apache Nation  
President Ty Vicenti P.O.  
Box 507  
Dulce NM 87528

Pueblo of Pojoaque  
Governor George Rivera  
78 Cities of Gold Road  
Santa Fe NM 87506

Mescalero Apache Tribe  
President Fredrick Chino, Sr.  
P.O. Box 227  
Mescalero NM 88340

Pueblo of San Felipe  
Governor Jimmy Cimarron  
P.O. Box 4339  
San Felipe Pueblo NM 87001

Pueblo of Nambe  
Governor Phillip A. Perez  
Route 1, Box 117-BB  
Santa Fe NM 87506

Pueblo of San Ildefonso  
Governor Terry L. Aguilar  
Route 5, Box 315-A  
Santa Fe NM 87506

The Navajo Nation  
President Ben Shelly  
P.O. Box 9000  
Window Rock AZ 86515

Navajo Nation Council, Office of the Speaker  
Speaker Johnny Naize  
P.O. Box 3390  
Window Rock AZ 86515

Ohkay Owingeh  
Governor Marcelino Aguino  
P.O. Box 1099  
San Juan Pueblo NM 87566

Pueblo of Sandia  
Governor Victor Montoya  
481 Sandia Loop  
Bernalillo NM 87004

Pueblo of Acoma  
Governor Gregg Shutiva  
P.O. Box 309  
Acoma NM 87034

Pueblo of Santa Ana  
Governor Myron Armijo  
2 Dove Road  
Santa Ana Pueblo NM 87004

Pueblo of Cochiti  
Governor J. Leroy Arquero  
P.O. Box 70  
Cochiti Pueblo NM 87072

Pueblo of Santa Clara  
Governor J. Bruce Tafoya  
P.O. Box 580  
Española NM 87532

Pueblo of Jemez  
Governor Vincent Toya, Sr.  
P.O. Box 100  
Jemez Pueblo NM 87024

Pueblo of Santo Domingo  
Governor Felix Tenorio, Jr.  
P.O. Box 99  
Santo Domingo Pueblo NM 87052

Pueblo of Taos  
Governor Ernesto C. Luhan  
P.O. Box 1846  
Taos NM 87571

Pueblo of Zia  
Governor Harold Reid  
135 Capital Square Drive  
Zia Pueblo NM 87053

Hopi Tribal Council  
Chairman LeRoy N. Shingoitewa  
P.O. Box 123  
Kykotsmovi AZ 86039

All Indian Pueblo Council  
Chairman Chandler Sanchez  
2401 12 Street NW  
Albuquerque NM 87103

White Mountain Apache Tribe  
Chairman Ronnie Lupe  
P.O. Box 700  
White River AZ 85941

Pueblo of Tesuque  
Governor Mark Mitchell  
Route 42, Box 360-T  
Santa Fe NM 87506

Ysleta del Sur Pueblo  
Governor Frank Paiz  
117 S. Old Pueblo Road  
(P.O. Box 17579)  
El Paso TX 79907

Eight Northern Indian Pueblos Council  
Director Rob Corabi  
P.O. Box 969  
San Juan Pueblo NM 87566

Five Sandoval Indian Pueblos  
Director James Roger Madalena  
1043 Highway 313  
Bernalillo NM 87004

Example Tribal Scoping LetterDEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 377TH AIR BASE WING (AFMC)

Colonel John C. Kubinec  
377ABW/CC  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB New Mexico 87117-5000

Governor E. Paul Torres  
Pueblo of Isleta  
P.O. Box 1270  
Isleta Pueblo NM 87022

**SUBJECT:** Government to Government Consultation for the Defense Threat Reduction Agency's (DTRA) Proposed Testing and Associated Training Use of the Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland Air Force Base; Bernalillo County, New Mexico.

Dear Governor Torres

The Defense Threat Reduction Agency (DTRA) at Kirtland Air Force Base (KAFB), Bernalillo County, New Mexico is preparing an Environmental Assessment (EA) addressing the physical, environmental, cultural, and socioeconomic effects of proposed ongoing and enhanced testing and associated training use of the approximately 155-acre Giant Reusable Air Blast Simulator (GRABS) Site for explosives testing. The GRABS Site, in operation since 1971, has an existing limit of 1,000 pounds of TNT equivalent for a variety of explosive testing scenarios. The GRABS Site is located within the greater boundaries of KAFB (see Figure 1).

In 1993, DTRA completed an EA addressing activities performed and proposed at the GRABS Site. Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800, and the Air Force NEPA regulation (32 CFR Part 989). No complaints from the public have been received due to any explosives or other testing conducted at the GRABS Site.

Given the length of time that has elapsed since the 1993 EA, DTRA and the U.S. Air Force have determined that a new, current EA is appropriate. This new EA will assess ongoing and enhanced testing and associated training activities at the GRABS Site, using current environmental data and current testing terminology, which may have changed over the course of the last 19 years. However, the maximum limit of 1,000 pounds of TNT equivalent at the Site would NOT change. DTRA would continue to follow and implement existing health and safety plans, including the GRABS Explosives Site Plan (ESP) and the Health and Safety Risk Analysis (HASRA); these plans will be discussed in the EA. The EA will describe ongoing testing and associated training activities at the Site, as well as any reasonably foreseeable future activities at the Site.

The locations of the GRABS Site and existing facilities and features are shown on the attached Figure 1.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA; 36 Code of Federal Regulations [CFR] Parts 800.2, 800.3, and 800.4) and Executive Order 13175, the Air Force would like to initiate government to government consultation concerning the proposed project to allow you the opportunity to identify any comments, concerns, and/or suggestions that you might have. Additionally, as we move forward through the process, various draft documents will be forwarded for your review and comment.

Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project and/or proceed with Section 106 consultation.

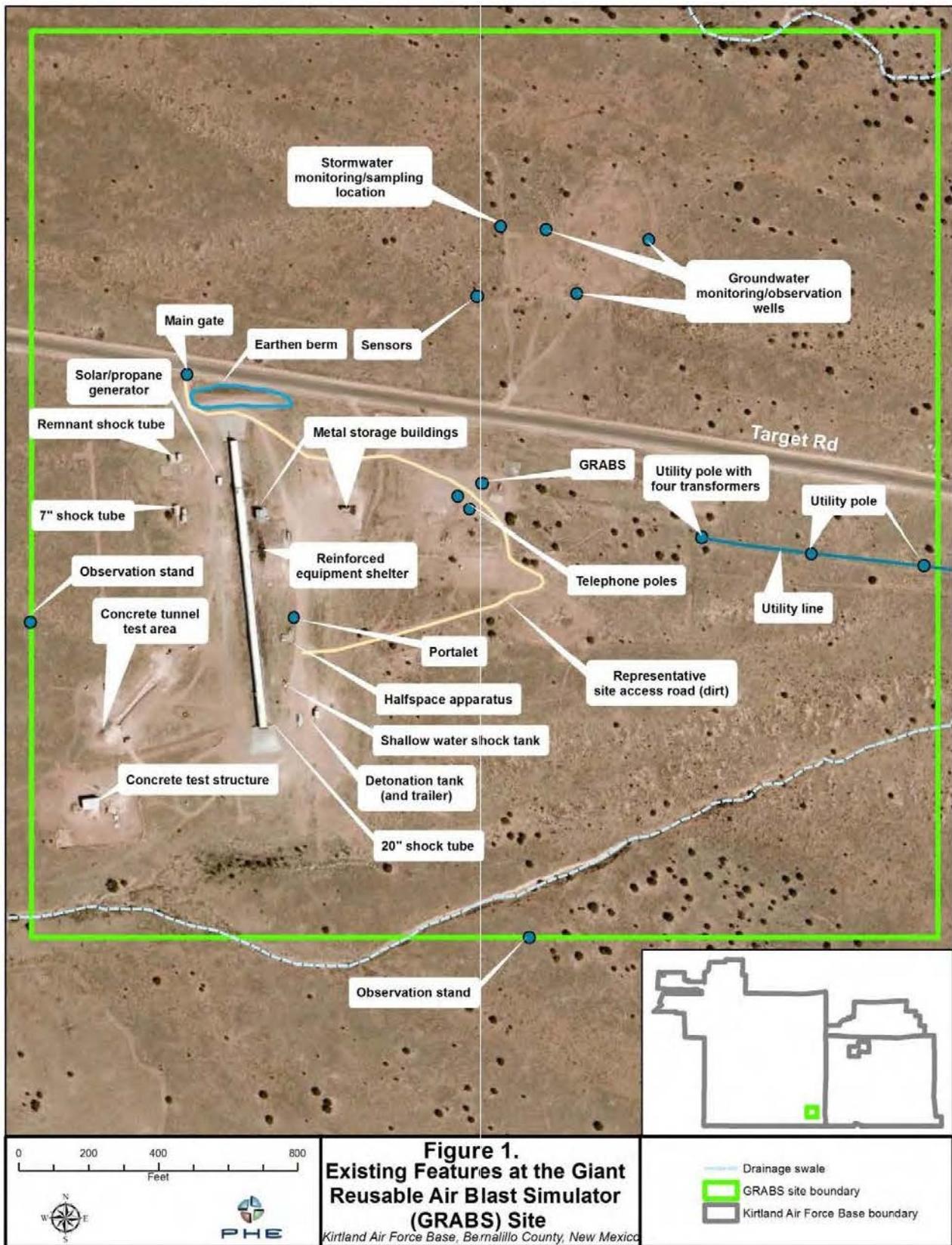
Sincerely



JOHN C. KUBINEC, Colonel, USAF  
Commander

Attachment:

Figure 1. GRABS Site - Site Location and Existing Features



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## Tribal Scoping Letter Response

**From:** Garcia, Martha E Civ USAF AFMC 377 MSG/CEIE  
**To:** [michael.richardson@dtra.mil](mailto:michael.richardson@dtra.mil); "Fraher, Jeffrey T. CIV CXTS"  
**Cc:** Montano, Patrick A Civ USAF AFMC 377 MSG/CEIE; Renner, Valerie A Civ USAF DoD AFCEC/CZO; Akins, Dustin D Civ USAF 377 MSG 377 MSG/CEIE  
**Subject:** FW: Isleta REQUEST: Department of Defense, request consultation for Defense Threat Reduction proposed testing of Reusable Air Blast Simulator site at KAFB.  
**Date:** Friday, April 19, 2013 7:39:00 AM  
**Attachments:** [00362.pdf](#)  
**Importance:** High

---

Jeff/Michael,

Isleta Pueblo would like to meet to discuss the GRABS EA actions. This is NOT a bad thing, nor does it mean that they want to stop activities out there; they just would like to meet and get more information. I understand you will need to inform your supervisors, but I think someone familiar with GRABS activities should be present. My office cannot speak to the specifics of your activities on GRABS. Valerie is going to scheduling the meeting. We'll be in touch with meeting details as soon as they become available.

If you have any immediate concerns, Val said to give her a call @ 846-8840.

Martha E. Garcia  
Kirtland AFB NEPA Program  
377 MSG/CEIE  
(505) 846-6446  
DSN: 246-6446

-----Original Message-----

From: Montano, Patrick A Civ USAF AFMC 377 MSG/CEIE  
Sent: Thursday, April 18, 2013 5:49 PM  
To: Garcia, Martha E Civ USAF AFMC 377 MSG/CEIE; Renner, Valerie A Civ USAF DoD AFCEC/CZO; Akins, Dustin D Civ USAF 377 MSG 377 MSG/CEIE  
Cc: Vanover, Marie M Civ USAF AFMC 377 ABW/PA  
Subject: FW: Isleta REQUEST: Department of Defense, request consultation for Defense Threat Reduction proposed testing of Reusable Air Blast Simulator site at KAFB.

All, see below. This was generated by an IICEP letter for a DTRA action/EA. Looks like Isleta wants to meet to discuss this action/EA and get a better understand of the project. Martha/Val - contact Marie at PA and see how they want to handle this. Since this is a NEPA issue with a Tribal entity, I would like to keep this meeting low key - probably Val, Martha, PA, and someone from DRTA that has best knowledge of the project.

thanks

//Signed//  
PATRICK A. MONTANO, GS-13  
377 MSG/CEIE  
Chief, Environmental Management Section  
Kirtland AFB, NM 87117  
505-846-8577, DSN 246-8577  
[patrick.montano@kirtland.af.mil](mailto:patrick.montano@kirtland.af.mil)

-----Original Message-----

From: Wilson, Brent Civ USAF AFMC 377 MSG/CE

Sent: Thursday, April 18, 2013 5:14 PM  
To: Montano, Patrick A Civ USAF AFMC 377 MSG/CEIE  
Cc: Pike, John S Civ USAF 377 MSG 377 MSG/CEI-CEO  
Subject: Isleta REQUEST: Department of Defense, request consultation for Defense Threat Reduction proposed testing of Reusable Air Blast Simulator site at KAFB.

Pat,  
Please work with Marie as required to make this happen. Keep me posted.

\signed//  
D. BRENT WILSON, PE  
Base Civil Engineer  
Kirtland AFB, NM  
505-846-7911 or dsn 246-7911

-----Original Message-----

From: Vanover, Marie M Civ USAF AFMC 377 ABW/PA  
Sent: Thursday, April 18, 2013 5:08 PM  
To: 377 ABW/CC Wing Commander  
Cc: Garcia, Dolores D Civ USAF AFMC 377 ABW/CCS; 377 ABW/CCE Administrative Mailbox; Lanning, Jeffrey W Col USAF AFMC 377 MSG/CC; Wilson, Brent Civ USAF AFMC 377 MSG/CE  
Subject: FW: Department of Defense, request consultation for Defense Threat Reduction proposed testing of Reusable Air Blast Simulator site at KAFB.

Sir  
I received the e-mail below from Steve Abeita requesting a meeting to discuss the attached EA being prepared by DTRA. Would you like us to set up a meeting and if so, should we include a rep from DTRA?  
Please advise.

VR-Marie  
Marie M. Vanover  
Director, Kirtland Public Affairs  
2000 Wyoming Blvd SE  
Kirtland AFB NM 87117  
[marie.vanover@kirtland.af.mil](mailto:marie.vanover@kirtland.af.mil)  
Comm: 505-846-5991  
DSN: 246-5991  
Mobile: 210-885-4136  
Aim High . . . Fly-Fight-Win

-----Original Message-----

From: Abeita, Steve [<mailto:POJ35960@isletapueblo.com>]  
Sent: Thursday, April 18, 2013 4:31 PM  
To: Vanover, Marie M Civ USAF AFMC 377 ABW/PA  
Cc: Dixon, Mark  
Subject: FW: Department of Defense, request consultation for Defense Threat Reduction proposed testing of Reusable Air Blast Simulator site at KAFB.

Hello Marie,

One more thing - Governor wants us to meet with KAFB on this project, just to have a meeting and see what potential impacts if any this might have. Is this something you could facilitate as well or should I contact the Commander's office? Thank you again for your help!

From: Sutherland, Carmela  
Sent: Thursday, April 18, 2013 2:09 PM  
To: Governor Eddie Paul Torres; Lt. Governor Abeita, Isidor; Lt. Governor Chewiwi, Antonio; Padilla Jr., Pablo; Abeita, Steve; Jiron, Frank  
Subject: Department of Defense, request consultation for Defense Threat Reduction proposed testing of Reusable Air Blast Simulator site at KAFB.

Carmela Z. Sutherland, Executive Assistant

Pueblo of Isleta, Governor's Office

Post Office Box 1270

Isleta, NM 87022

Phone 505.869.3111

Direct Line 505.869.9760

Fax 505.869.7596

Attendance Sheet from Isleta Pueblo GRABS EA Meeting

GRABS EA Meeting with Isleta Pueblo 1 May 2013, Bldg 20604, 377 ABW Wing Conference Room

NAME	ORGANIZATION	E-MAIL	PHONE
Kelly Lauritzen	DTRA	Kelly.Lauritzen@dtra.mil	505 846-8877
Jeffrey Fraher	DTRA	jeffrey.fraher@dtra.mil	505 846-6991
Michael Richardson	DTRA	Michael.Richardson@dtra.mil	505 846-1367
Martha Garcia	377 MSG/CEIE	Martha.garcia@kirtland.af.mil	505-846-6846
Michelle Bare	377 MSG/CEIE	Michelle.bare.ctr@kirtland.af.mil	505-846-3774
MARK DIXON	Pueblo of Isleta	poi36872@isletapueblo.com	869 7560
Chawna Balby	Pueblo of Isleta	poi9001@isletapueblo.com	382-4745
Meredith Mingladruff	377 ABW Public Affairs	meredith.a.mingladruff@kirtland.af.mil	505-846-5991
Patrick Montano	377 MSG/CEIE	patrick.montano@kirtland.af.mil	505-846-8577
Steve Abell	Pueblo of Isleta	poi35960@isletapueblo.com	505-864-5748
Randy Lyman	Pueblo of Isleta	Poi92001@Isletapueblo.Com	505-869-7566
Valerie Renner	AFCEC/CZON	valerie.renner@us.af.mil	505-846-8840
Dustin Akins	377 MSG/CEIE	dustin.akins@kirtland.af.mil	505-846-0226

Isleta Pueblo GRABS EA Presentation Slides:

# DTRA Environmental Assessment



**Defense Threat Reduction Agency (DTRA)  
Proposed Testing and Associated Training Use of the  
Giant Reusable Air Blast Simulator (GRABS) Site at  
Kirtland Air Force Base  
Environmental Assessment (EA)**



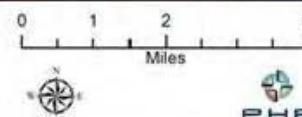
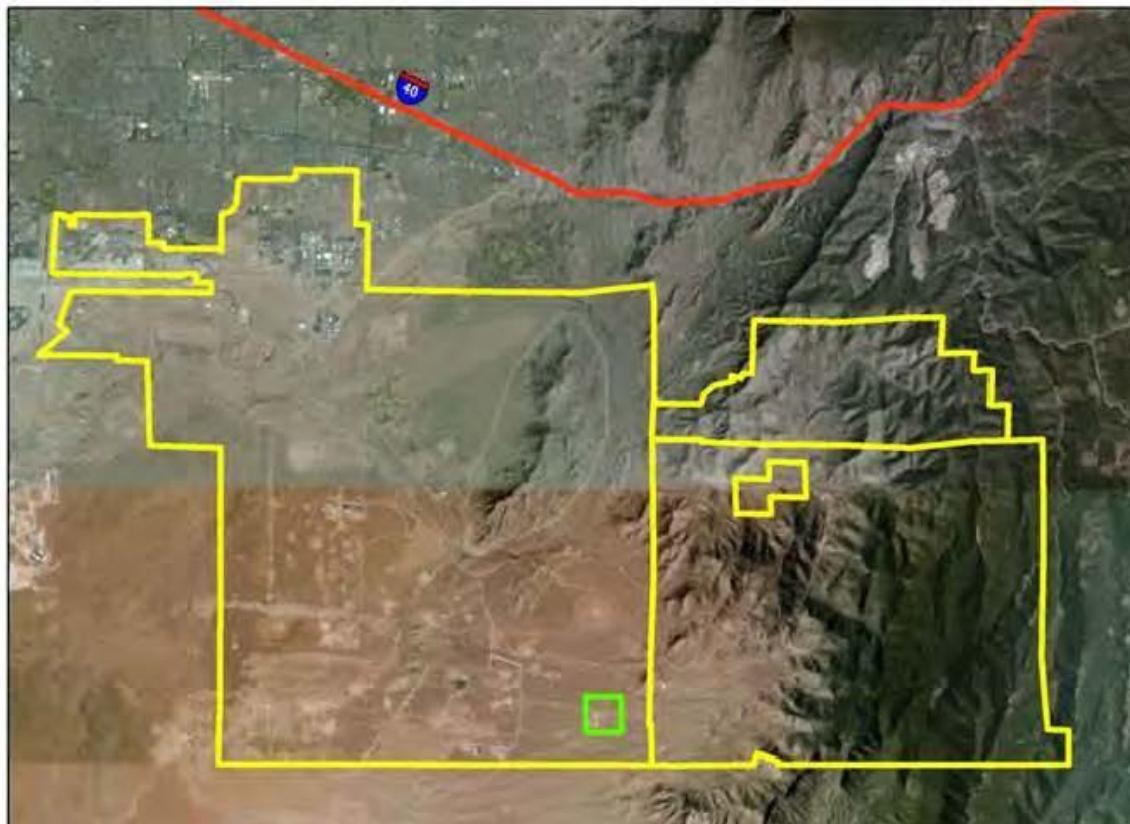
## *Why Kirtland AFB and DTRA are Writing a New GRABS Site EA*



- Initial GRABS EA was completed in 1993 and reflects the conditions in 1993
- The 1993 EA has not been updated or reviewed for accuracy and much of the language used to describe DTRA test activities has changed
- In 2012, Kirtland AFB NEPA Program decided to review and update EAs which were over 20 years old; DTRA concurred with the decision
- **EA Status:**
  - Draft Description of Proposed Action and Alternatives (DOPAA) is currently being reviewed by DTRA and Kirtland AFB personnel
  - Final DOPAA (Estimated Date) – 15 June 2013
  - Draft EA available for public review (Estimated Date) – 15 Aug 2013



## Location of GRABS Site on Kirtland AFB in Relation to Surrounding Area



**Figure 1.**  
**General Location of**  
**Kirtland Air Force Base**  
*Bernalillo County, New Mexico*

- Interstate highway
- GRABS site boundary
- Kirtland Air Force Base boundary



## *Current DTRA Activities at GRABS Site*

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- DTRA currently conducts fundamentally the same type of events as covered in the 1993 EA
  - Development testing for new explosives
  - Instrumentation development tests to include balloon activities
  - Dust dissemination experiments
  - Explosive effects tests against various structures
  - Non-explosive equipment testing
  - Structural rock (limestone) testing



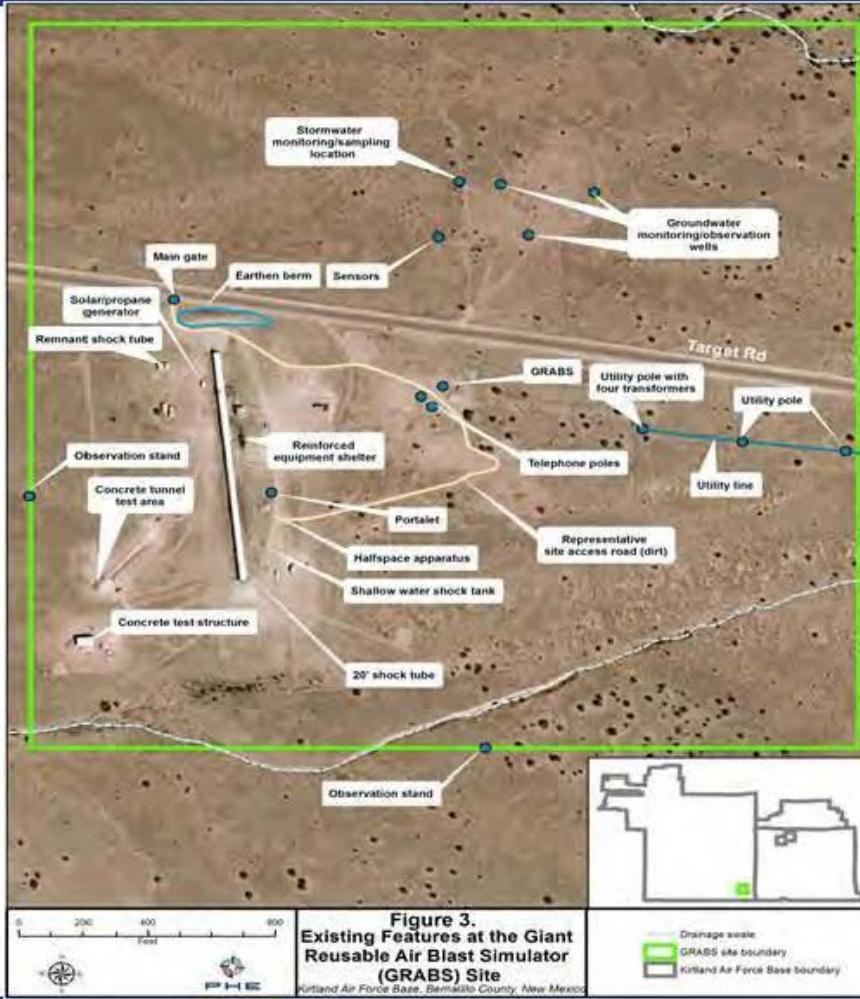
## *Proposed DTRA Activities at GRABS Site*

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- DTRA proposes to continue many of the current activities
- DTRA no longer uses many of the test articles in the 1993 EA and may retire them
- New proposed activities
  - Use of an organic pesticide as a simulant for small scale tests and instrumentation development
  - Use of the 20' shock tube for non-explosive test activities (i.e.: evaluation of low frequency waves)
  - Scaled and non-scaled test structures may be built to test current and new building designs against explosive devices
- **No new impacts to surrounding areas envisioned**



## Existing Features at GRABS Site



**Minutes from Isleta Pueblo GRABS EA Meeting:**

**Notes from 1 May 2013 Meeting with Pueblo of Isleta Regarding  
Defense Threat Reduction Agency (DTRA) Environmental Assessment  
Addressing Testing and Associated Training Use of the  
Giant Reusable Air Blast Simulator (GRABS) Site at  
Kirtland Air Force Base, New Mexico**

Meeting Attendees: Shawna Ballay (Pueblo of Isleta)  
Randy Lujan (Pueblo of Isleta)  
Mark Dixon (Pueblo of Isleta)  
Steve Abeita (Pueblo of Isleta)  
Colonel Kelly Lauritzen (DTRA)  
Jeffrey Fraher (DTRA)  
Michael Richardson (DTRA)  
Meredith Mingledorff (377 ABW/PA)  
Patrick Montaño (377 MSG/CEIE)  
Martha Garcia (377 MSG/CEIE)  
Dustin Akins (377 MSG/CEIE)  
Michelle Bare (377 MSG/CEIE)  
Valerie Renner (AFCEC/CZOW)

Patrick Montaño informed the group that this meeting was being held in response to Intergovernmental and Interagency Coordination of Environmental Planning letters sent out informing interested parties that DTRA at Kirtland AFB is preparing an EA addressing the effects of proposed ongoing and enhanced testing and associated training use of the approximately 155 acre GRABS Site for explosives testing. The Pueblo of Isleta contacted the base upon receipt of this letter asking for additional information.

Mr. Montaño stated that an EA for the GRABS Site had been prepared in 1993 and had not been updated or reviewed since its preparation and that much of the language used to describe test activities has changed since that time. Therefore, because the EA was over 20 years old, the base and DTRA agreed that a new EA should be prepared.

**Slides that were presented are attached. The following additional items were discussed.**

Jeff Fraher provided background information detailing the type of testing DTRA has conducted in the past and would like to continue in the future. Tests conducted at the GRABS Site are small-scale, up to 900 pounds of explosives. Balloons are used to gather air results by placing sensors on them to a certain elevation. Training to raise and lower the balloons is also conducted. Mortars are used to conduct dust blasts to see how high in the air things can be dispersed. The GRABS tube is a simulated missile effects silo buried on the site in limestone.

Patrick Montaño stated that although an EA is being prepared, an AF Form 813 will be submitted for each proposed test activity to be conducted at the GRABS Site. Each activity will be compared against the EA to ensure the action was analyzed in the EA. At that point, the AF Form 813 will be provided a categorical exclusion (CATEX) detailing any environmental guidelines that must be implemented during project activities.

Mr. Fraher stated some of the new proposed activities include the use of an organic pesticide to be used as a simulant for small-scale tests and instrumentation development. This proposed scaled test activity would allow DTRA to evaluate the most effective materials and sensors to use when targeting chemical/biological factories and depots to avoid or measure downwind contamination. DTRA is also proposing to use the 20' shock tube for non-explosive test activities to include the evaluation of low frequency waves. Scale and non-scale test structures may also be built on site to test current and new building designs against explosive devices. Approximately 20 tests would be conducted per year. Mr. Fraher stated that DTRA's tests have been used in the support of modifying and constructing civilian and military structures such as court houses and the Pentagon.

Steve Abeita asked whether any environmental sampling was conducted at the site, in particular were samples routinely taken from the three groundwater monitoring wells notated on Slide 6. Mr. Montaño stated that the Environmental Restoration (ER) group may do soil and groundwater sampling, but those would be related to Restoration sites. He stated that the monitoring wells were not associated with the activities conducted by DTRA. Mr. Abeita stated that he was concerned with perchlorates. Mr. Fraher stated that perchlorates have never been used at the GRABS Site. Mr. Abeita stated that he was interested because Barren<sup>11</sup> Mountain was used as a water reserve for the tribe.

- Following the meeting it was determined that these wells are associated with the Department of Energy ER Solid Waste Management Unit (SWMU) 68, the Old Burn Site. Samples of these monitoring wells are taken quarterly, most recently in October 2012. No analytical results for the SWMU 68 groundwater samples exceeded USEPA's maximum contaminant levels (MCLs).

Mr. Fraher informed the group that DTRA has a seismic team that monitors wind and weather conditions prior to any test activity. If winds exceed 30 mph, test activities are shut down for the day. He also stated that based on restrictions in their current Albuquerque Environmental Health Department – Air Quality Division Fugitive Dust Control Programmatic Permit, no more than 5 acres can be cleared at any one time for test activities.

In closing, Mr. Montaño stated that the base will provide a copy of the Description of the Proposed Action and Alternatives (DOPAA) once it is finalized. At this time, the meeting attendees went out to the GRABS Site to tour the Site.

---

<sup>11</sup> Unable to confirm the name of the Mountain

**Federal, State, and Local Agencies – Public Notice Letters**

Dr. Benjamin Tuggle, Regional Director  
U.S. Fish and Wildlife Service  
Southwest Regional Office  
PO Box 1306  
Albuquerque NM 87103-1306

Ms. Peg Sorenson  
Southwestern Region NEPA Coordinator  
U.S. Forest Service  
Ecosystem Analysis and Planning, Watershed,  
and Air Management  
333 Broadway Boulevard SE  
Albuquerque NM 87102

Ms. Julie Alcon  
Chief of Environmental Resources Section  
U.S. Army Corps of Engineers  
4101 Jefferson Plaza NE  
Albuquerque NM 87109

Mr. Ron Curry, Regional Administrator  
U.S. Environmental Protection Agency,  
Region 6  
1445 Ross Avenue, Suite 1200  
Dallas TX 75202

Ms. Pearl Armijo, District Conservationist  
National Resources Conservation Service  
Albuquerque Service Center  
6200 Jefferson NE, Room 125  
Albuquerque NM 87109

Mr. Ed Singleton, District Manager  
Bureau of Land Management  
New Mexico State Office  
Albuquerque District Office  
435 Montaño Road NE  
Albuquerque NM 87107

The Honorable Martin Heinrich  
United States Senate  
625 Silver Avenue SW, Suite 130  
Albuquerque NM 87102

The Honorable Tom Udall  
United States Senate  
219 Central Avenue NW, Suite 210  
Albuquerque NM 87102

The Honorable Michelle Lujan Grisham  
United States House of Representatives  
505 Marquette Avenue NW, Suite 1605  
Albuquerque NM 87102

The Honorable Steve Pearce  
United States House of Representatives  
3445 Lambros Loop NE  
Los Lunas NM 87031

The Honorable Ben Luján  
United States House of Representatives  
1611 Calle Lorca, Suite A  
Santa Fe NM 87505

Mr. Jeff Robbins  
NNSA Service Center/Albuquerque  
Kirtland AFB East, Building 401  
PO Box 5400  
Albuquerque NM 87185-5400

Mr. Tim Tandy  
Federal Aviation Administration  
Southwest Region Regional Office  
2601 Meacham Boulevard  
Fort Worth TX 76137

Mr. Morgan Nelson  
Office of General Counsel & Environmental  
Policy  
New Mexico Environment Department  
1190 St Francis Drive, Suite N4050  
Santa Fe NM 87505

Mr. Matt Wunder, Chief  
Conservation Services  
New Mexico Department of Game and Fish  
1 Wildlife Way  
Santa Fe NM 87507

Mr. Jeff M. Witte, Director/Secretary  
New Mexico Department of Agriculture  
3190 S. Espina  
Las Cruces NM 88003

Mr. F. David Martin  
Cabinet Secretary-Designate  
New Mexico Energy, Minerals and Natural  
Resources Department  
1220 South St Francis Drive  
Santa Fe NM 87505

Mr. Ray Powell, Commissioner  
Commissioner of Public Lands  
New Mexico State Land Office  
310 Old Santa Fe Trail  
Santa Fe NM 87501

Dr. Jeff Pappas, PhD  
State Historic Preservation Officer and Director  
New Mexico Office of Cultural Affairs  
New Mexico Historic Preservation Division  
Bataan Memorial Building  
407 Galisteo Street, Suite 236  
Santa Fe NM 87501

Mr. Bill Walker, Regional Director  
Bureau of Indian Affairs  
Southwest Regional Office  
1001 Indian School Road NW  
Albuquerque NM 87104

Mr. Tom Zdunek, Bernalillo County Manager  
Bernalillo County Manager's Office  
One Civic Plaza NW, 10th Floor  
Albuquerque NM 87102

Ms. Erin Thompson  
Director of Communications  
City of Albuquerque Office of the Mayor  
One Civic Plaza NW, 11th Floor  
Albuquerque NM 87102

Board of Directors  
Mid Region Council of Governments  
809 Copper Avenue NW  
Albuquerque NM 87102

Commissioner  
Bernalillo County Board of Commissioners  
One Civic Plaza NW, 10th Floor  
Albuquerque NM 87102

Councilmember  
Albuquerque City Councilmembers  
One Civic Plaza NW  
9th Floor, Suite 9087  
Albuquerque NM 87102

Mr. Don Britt  
Assistant Commissioner for Commercial  
Resources  
New Mexico State Land Office  
PO Box 1148  
Santa Fe NM 87504

City of Albuquerque Planning Department  
PO Box 1293  
Albuquerque NM 87103

Development Management/Department Director  
Bernalillo County Planning Section  
111 Union Square SE, Suite 100  
Albuquerque NM 87102

**Example Public Notice Letter**

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 377TH AIR BASE WING (AFMC)

Colonel Tom D Miller  
377 ABW/CC  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB NM 87117-5000

The Honorable Tom Udall  
United States Senate  
219 Central Avenue NW Suite 210  
Albuquerque NM 87102

Dear Senator Udall

The Defense Threat Reduction Agency (DTRA) and the U.S. Air Force (USAF) are preparing an Environmental Assessment (EA) for proposed ongoing and enhanced testing and associated training use of the Giant Reusable Air Blast Simulator (GRABS) Site for explosives testing. The GRABS Site has been in operation since 1971 and has been used for a variety of explosive testing scenarios. Prior to its development as the GRABS Site by DTRA's predecessor agency, the Defense Nuclear Agency, the area was used by the U.S. Army in 1944 and 1945 as an impact range for artillery practice and in the 1950s, Sandia National Laboratories used the area for proximity fuse testing. The GRABS Site is located within the southeastern portion of Kirtland Air Force Base (AFB) (see Figure 1).

In 1993, the Defense Nuclear Agency completed an EA addressing activities performed and proposed at the GRABS Site. Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code §4371 et seq.), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the USAF NEPA regulation (32 CFR Part 989). To date, no complaints have been received from the public due to any explosives or other testing conducted at the GRABS Site.

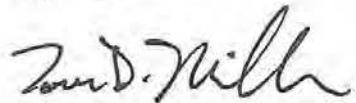
Given the length of time that has elapsed since the 1993 EA, DTRA and the USAF have determined the preparation of an updated EA is appropriate. This EA will assess ongoing and enhanced testing and associated training activities at the GRABS Site, using current environmental data and current testing terminology, which may have changed over the course of the last 19 years. Testing at the GRABS Site involves the design, analysis, and testing of structures, new equipment, and explosives. The types of structures involved may include personnel protective structures, missile silos, bunkers, aircraft hangars, antennas, and tunnels. The existing net explosive weight limit of 900 pounds used at the Site would not change. DTRA would continue to follow and implement existing health and safety plans. The EA describes ongoing testing and associated training activities at the Site, as well as any reasonably foreseeable proposed future activities at the Site. The location of the GRABS Site and existing facilities and features are shown on the attached Figure 1.

This EA is being prepared in accordance with NEPA, CEQ regulations implementing NEPA, and the USAF NEPA regulation. This EA evaluates the potential impacts of the proposed action and alternatives, to include the no action alternative, on humans and the natural environment. Additionally, Executive Order 12372, *Intergovernmental Review of Federal Programs*, requires federal agencies to solicit other federal agency participation in the NEPA process. Accordingly, I am requesting your participation in the review and comment process. Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available at <http://www.kirtland.af.mil> under the environmental tab.

If you have additional information regarding impacts of the proposed action to the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please provide your written comments on the Draft EA and proposed FONSI or other information regarding this specific action within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIE, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB, NM 87117, or via email to [nepa@us.af.mil](mailto:nepa@us.af.mil).

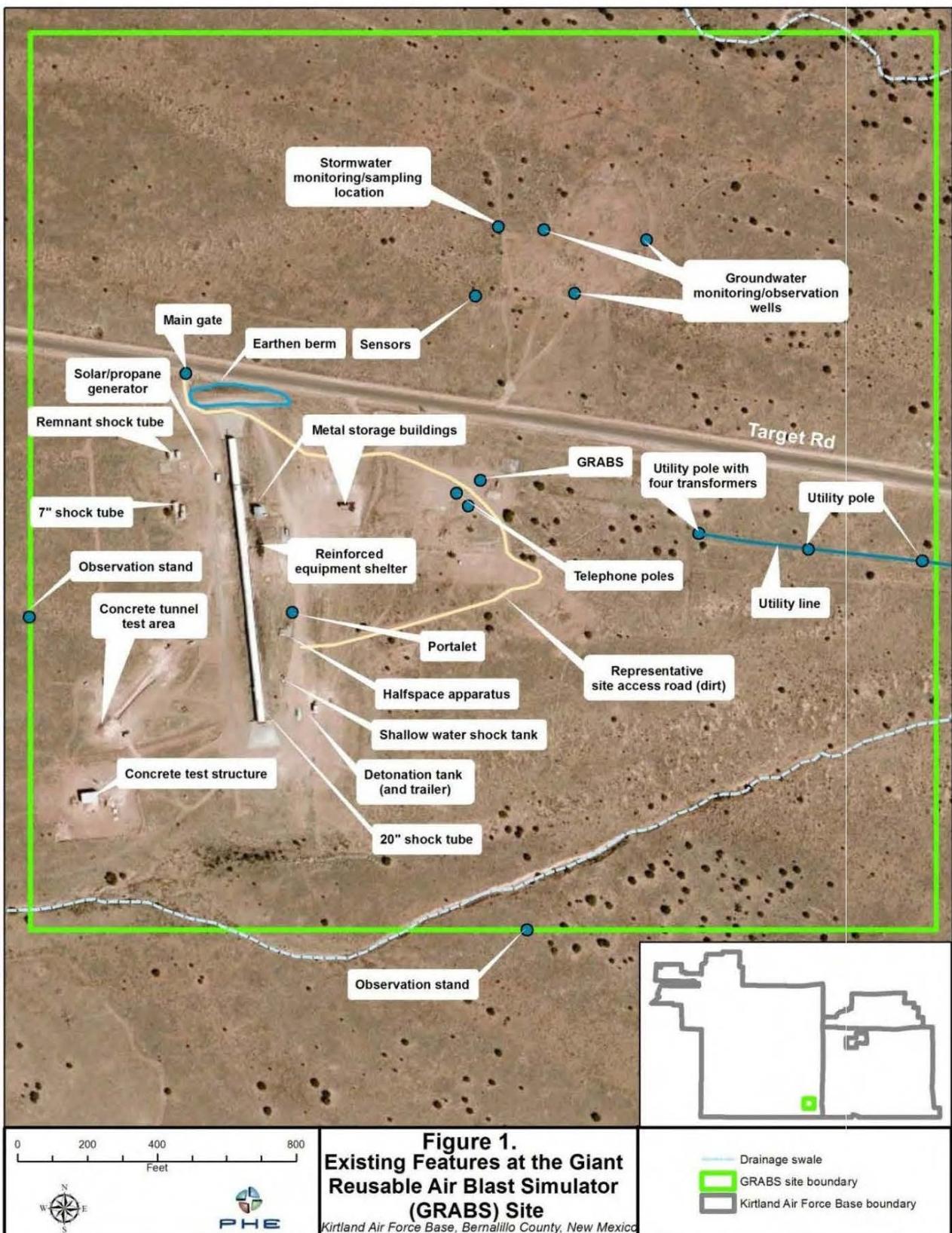
Sincerely



TOM D. MILLER, Colonel, USAF  
Commander

Attachment:

Figure 1. Location of Giant Reusable Air Blast Simulator (GRABS) Site and Existing Features Found at the GRABS Site



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Public Notice Response Letters

## Mid-Region Council of Governments

Steve Anaya  
Chair, Board of Directors  
Councilor, City of Moriarty

Dewey V. Cave  
Executive Director

November 3, 2014

MEMBER GOVERNMENTS

City of Albuquerque  
Albuquerque Public Schools  
Albuquerque Metropolitan  
Arroyo Flood Control  
Authority  
City of Belen  
Bernalillo County  
Town of Bernalillo  
Village of Bosque Farms  
Village of Corrales  
Village of Cuba  
Town of Edgewood  
Village of Encino  
Town of Estancia  
Village of Jemez Springs  
Laguna Pueblo  
Village of Los Lunas  
Los Lunas Schools  
Village of Los Ranchos  
de Albuquerque  
Middle Rio Grande  
Conservancy District  
City of Moriarty  
Town of Mountainair  
Town of Peralta  
City of Rio Rancho  
Rio Rancho Public Schools  
Sandoval County  
Southern Sandoval  
County Arroyo Flood  
Control Authority  
Village of Tijeras  
Torrance County  
Valencia County  
Village of Willard

NEPA Program Manager  
377 MSG/CEIE  
2050 Wyoming Boulevard SE Suite 116  
Kirtland AFB NM 87117

Re: Giant Reusable Air Blast Simulator (GRABS) Site

Dear Sir:

On behalf of the Mid-Region Council of Governments (MRCOG), I would like to give my support for the Kirtland Air Force Base mission in regards to the continued operation of the GRABS Site on the base.

It is my understanding that the proposal would support updating the Environmental Assessment as well as ongoing testing and training activities within the boundaries of the Kirtland Air Force Base. At this time the MRCOG does not anticipate major impacts. However, as part of the Joint Land Use Study (JLUS) implementation plan, the KAFB should notify the City of Albuquerque Planning Department, the Bernalillo County Planning Department, and the Isleta Pueblo as to the GRABS Site.

The mission of the Kirtland Air Force is very important in this region and the MRCOG communities. This application for funding in no way conflicts with local or regional plans.

Please let me know if my staff or I can support you further.

Sincerely,

Dewey V. Cave  
Executive Director

DC/DW

809 Copper Ave. NW, Albuquerque, NM 87102  
Phone: (505) 247-1750 Fax (505) 247-1753 Web: [www.mrcog-nm.gov](http://www.mrcog-nm.gov)

**BARE, MICHELLE P CTR USAF AFMC 377 MSG/CEIE**

**From:** 377 MSG/CEAN NEPA Environmental Assessment  
**Sent:** Thursday, December 11, 2014 2:11 PM  
**To:** BARE, MICHELLE P CTR USAF AFMC 377 MSG/CEIE  
**Subject:** FW: TEAMS and GRABS

Martha E. Garcia  
Kirtland AFB NEPA Program Manager  
377 MSG/CEIE  
(505) 846-6446  
DSN: 246-6446

---

**From:** Sorensen, Peg -FS [mailto:[psorensen@fs.fed.us](mailto:psorensen@fs.fed.us)]  
**Sent:** Thursday, December 11, 2014 2:03 PM  
**To:** 377 MSG/CEAN NEPA Environmental Assessment  
**Subject:** TEAMS and GRABS

Dear Sir;  
The Southwestern Region of the USDA Forest Service has no responsive comments or issues on the TEAMS or GRABS project proposals. Thank you for including us in your public participation efforts.

Peg Sorensen, Regional Environmental Coordinator (NEPA)  
Southwestern Region, USDA Forest Service  
333 Broadway Blvd. SE  
Albuquerque, NM 87102 505-842-3256

This electronic message contains information generated by the USDA solely for the intended recipients. Any unauthorized interception of this message or the use or disclosure of the information it contains may violate the law and subject the violator to civil or criminal penalties. If you believe you have received this message in error, please notify the sender and delete the email immediately.

†



*State of New Mexico*  
ENVIRONMENT DEPARTMENT



*Office of the Secretary*

SUSANA MARTINEZ  
Governor  
JOHN A. SANCHEZ  
Lieutenant Governor

Harold Runnels Building  
1190 Saint Francis Drive, PO Box 5469  
Santa Fe, NM 87502-5469  
Telephone (505) 827-2855 Fax (505) 827-2836  
[www.nmenv.state.nm.us](http://www.nmenv.state.nm.us)

RYAN FLYNN  
Cabinet Secretary  
BUTCH TONGATE  
Deputy Secretary

December 16, 2014

NEPA Program Manager  
377 MSG/CEIE  
2050 Wyoming Blvd SE, STE 116  
Kirtland AFB, NM 87117  
[nepa@us.af.mil](mailto:nepa@us.af.mil)

RESPONSE BY EMAIL

**RE: Giant Reusable Air Blast Simulator Site EA**

To Whom It May Concern:

Your letter regarding the above named project was received by the New Mexico Environment Department (NMED) and was sent to various bureaus for review and comment. Comments were provided by the Ground Water Quality, Hazardous Waste, Solid Waste, and Surface Water Quality Bureaus, and are as follows.

**Ground Water Quality Bureau**

New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) staff reviewed the above-referenced letter as requested, focusing specifically on the potential effect to ground water resources in the area of the proposed project.

The letter states that the United States Air Force is preparing an updated Environmental Assessment (EA) (original EA completed in 1993) to evaluate potential environmental impacts associated with the ongoing and enhanced testing and associated training use of the Giant Reusable Air Blast Simulator (GRABS) site at the Kirkland Air Force Base. Testing at the GRABS site involves the design, analysis, and testing of structures, new equipment, and explosives. The types of structures involved may include personnel protective structures, missile silos, bunkers, aircraft hangers, antennas, and tunnels. The existing net explosive weight limit at the site is 900 pounds.

The letter does not provide enough information to determine if activities at the GRABS site produce a discharge that requires a ground water Discharge Permit in accordance with the Water Quality Act (WQA) and the Water Quality Control Commission (WQCC) Regulations (20.6.2 NMAC). Section 20.6.2.3104 NMAC prohibits the discharge of wastewater or leachate in such a manner that it could move directly or indirectly into ground water without a Discharge Permit.

Therefore, if activities at the GRABS site produce a discharge, then a Notice of Intent to Discharge (NOI) form must be submitted to the GWQB for evaluation. The submission of a NOI form will provide the information necessary for the GWQB to determine if a ground water Discharge Permit will be required.

#### **Hazardous Waste Bureau**

The Hazardous Waste Bureau does not have any comments on the EIR #5226 - Draft Environmental Assessment Proposed Enhanced Testing and Associated Training Use of the Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland Air Force Base, New Mexico.

#### **Solid Waste Bureau**

The Solid Waste Bureau does not have any comments on the EIR #5226 - Draft Environmental Assessment Proposed Enhanced Testing and Associated Training Use of the Giant Reusable Air Blast Simulator (GRABS) Site at Kirtland Air Force Base, New Mexico.

#### **Surface Water Quality Bureau**

##### Clean Water Act, Section 402 NPDES Industrial Storm Water Construction General Permit (CGP)

The U.S. Environmental Protection Agency (USEPA) requires National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb (or re-disturb) one or more acres, or smaller sites that are part of a larger common plan of development or sale. The total area of disturbed soil for the pipeline and the area of soil where the material removed is placed is included in total disturbed soil footprint. Prior to discharging storm water, construction operators must obtain coverage under an NPDES permit.

Among other things, this permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site, including support and staging areas, and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (re-vegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters.

Part 9 of the 2012 CGP includes permit conditions applicable to specific states, Indian country lands, or territories. In the State of New Mexico, except on tribal land, permittees must ensure that there is no increase in sediment yield and flow velocity from the construction site (both during and after construction) compared to pre-construction, undisturbed conditions (see Subpart 9.4.1.1 of the 2012 CGP).

USEPA requires that all "operators" (see Appendix A of the 2012 CGP) obtain NPDES permit coverage by submitting a Notice of Intent (NOI) for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications, the general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the SWPPP and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project.

The CGP was re-issued effective February 16, 2012. The CGP, NOI, deadlines for submitting an NOI, Fact Sheet, and Federal Register notice is available at:  
<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

Clean Water Act, Section 404 USACE/Section 401 Certification

Information is provided below if the project (or associated construction support areas, if any) during construction requires discharge of dredged/fill material into Waters of the U.S., including wetlands.

Section 404 of the Clean Water Act requires approval from the U.S. Army Corp of Engineers (USACE) prior to discharging dredged or fill material into waters of the United States (U.S.). Any person, firm, or agency (including Federal, state, tribal and local governmental agencies) planning to work in waters of the United States should first contact the USACE regarding the need to obtain a permit from the Regulatory Division. Failure to receive and implement proper permit coverage would be a violation of the Clean Water Act.

More information on the §404 permitting process, including applicability of Nationwide Permits, mitigation requirements, requirements for certification for any discharges on state, private or tribal land, can be obtained from the USACE at:

<http://www.spa.usace.army.mil/Missions/RegulatoryProgramandPermits.aspx>

NMED Surface Water Quality Bureau Watershed Protection Section coordinates the state's §401 certification of §404 dredged/fill material permits with the USACE. In response to the §404 reissued nationwide permits on April 13, 2012, a Conditional §401 Certification for discharges to State of New Mexico surface water has been issued and is available at the following web site:  
<ftp://ftp.nmenv.state.nm.us/www/swqb/WPS/401-404/NWPCertificationNotice04-13-2012.pdf>.

For additional information, including permitting procedures and jurisdictional water determination, contact the USACE, Albuquerque District, 4101 Jefferson Plaza NE, Albuquerque, New Mexico 87109-343, 505-342-3262.

I hope this information is helpful.

Sincerely,

**Morgan R. Nelson**

Digitally signed by Morgan R. Nelson  
DN: cn=Morgan R. Nelson, o=New Mexico Environment Department,  
ou=Office of General Counsel, email=morgan.nelson@state.nm.us, c=US  
Date: 2014.12.16 10:50:41 -07'00'

Morgan R. Nelson  
Environmental Impact Review Coordinator  
NMED File Number: EIR 5226

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**Native American Tribes – Public Notice Letters**

Pueblo of Isleta  
Governor E. Paul Torres  
PO Box 1270  
Isleta NM 87022

Pueblo of Zuni  
Governor Arlen P. Quetawki, Sr.  
PO Box 339  
Zuni NM 87327

Jicarilla Apache Nation  
President Ty Vicenti  
PO Box 507  
Dulce NM 87528

Mescalero Apache Tribe of the Mescalero  
Apache Reservation  
President Danny Breuninger, Sr.  
PO Box 227  
Mescalero NM 88340

Pueblo of Nambe  
Governor Phillip A. Perez  
Route 1, Box 117-BB  
Santa Fe NM 87506

Navajo Nation  
President Ben Shelly  
PO Box 9000  
Window Rock AZ 86515

Ohkay Owingeh  
Governor Marcelino Aguino  
PO Box 1099  
San Juan Pueblo NM 87566

Pueblo of Acoma  
Governor Fred S. Vallo, Sr.  
PO Box 309  
Acoma Pueblo NM 87034

Pueblo of Cochiti  
Governor Joseph H. Suina, PhD  
PO Box 70  
Cochiti Pueblo NM 87072

Pueblo of Jemez  
Governor Joshua Madalena  
PO Box 100  
Jemez Pueblo NM 87024

Pueblo of Laguna  
Governor Richard B. Luarkie  
PO Box 194  
Laguna NM 87026

Pueblo of Picuris  
Governor Richard B. Mermejo  
PO Box 127  
Peñasco NM 87553

Pueblo of Pojoaque  
Governor George Rivera  
78 Cities of Gold Road  
Santa Fe NM 87506

Pueblo of San Felipe  
Governor Joseph E. Sandoval  
PO Box 4339  
San Felipe Pueblo NM 87001

Pueblo of San Ildefonso  
Governor Terry L. Aguilar  
Route 5, Box 315-A  
Santa Fe NM 87506

22nd Navajo Nation Council  
Office of the Speaker  
Speaker Johnny Naize  
PO Box 3390  
Window Rock AZ 86515

Pueblo of Sandia  
Governor Stuart Paisano  
481 Sandia Loop  
Bernalillo NM 87004

Pueblo of Santa Ana  
Governor George M. Montoya  
2 Dove Road  
Santa Ana Pueblo NM 87004

Pueblo of Santa Clara  
Governor J. Michael Chavarria  
PO Box 580  
Espanola NM 87532

Pueblo of Santo Domingo  
Governor Oscar K. Lovato  
PO Box 99  
Santo Domingo Pueblo NM 87052

Pueblo of Taos  
Governor Clyde M. Romero  
PO Box 1846  
Taos NM 87571

Hopi Tribal Council  
Chairman Herman G. Honanie  
PO Box 123  
Kykotsmovi AZ 86039

Ysleta del Sur Pueblo  
Governor Frank Paiz  
117 S. Old Pueblo Road  
(PO Box 17579)  
El Paso TX 79907

Eight Northern Indian Pueblos Council  
Executive Director Gil L. Vigil  
PO Box 969  
San Juan Pueblo NM 87566

Pueblo of Zia  
Governor David Pino  
135 Capitol Square Drive  
Zia Pueblo NM 87053-6013

All Pueblo Council of Governors  
Chairman Terry L. Aguilar  
2401 12th Street NW  
Albuquerque NM 87103

Pueblo of Tesuque  
Governor Robert Mora, Sr.  
Route 42 Box 360-T  
Santa Fe NM 87506

White Mountain Apache Tribe of the  
Fort Apache Reservation  
Chairman Ronnie Lupe  
PO Box 700  
Whiteriver AZ 85941

Five Sandoval Indian Pueblos  
Executive Director James Roger Madalena  
1043 Highway 313  
Bernalillo NM 87004

Example Tribal Public Notice Letter

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 377TH AIR BASE WING (AFMC)

Colonel Tom D Miller  
377 ABW/CC  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB NM 87117-5000

President Danny Breuninger, Sr.  
Mescalero Apache Tribe of the  
Mescalero Apache Reservation  
PO Box 227  
Mescalero NM 88340

Dear President Breuninger

The Defense Threat Reduction Agency (DTRA) and the U.S. Air Force (USAF) are preparing an Environmental Assessment (EA) for proposed ongoing and enhanced testing and associated training use of the Giant Reusable Air Blast Simulator (GRABS) Site for explosives testing. The GRABS Site has been in operation since 1971 and has been used for a variety of explosive testing scenarios. Prior to its development as the GRABS Site by DTRA's predecessor agency, the Defense Nuclear Agency, the area was used by the U.S. Army in 1944 and 1945 as an impact range for artillery practice and in the 1950s, Sandia National Laboratories used the area for proximity fuse testing. The GRABS Site is located within the southeastern portion of Kirtland Air Force Base (AFB) (see Figure 1).

In 1993, the Defense Nuclear Agency completed an EA addressing activities performed and proposed at the GRABS Site. Since that time, various testing activities and events have been performed, and changes to test equipment and methods have occurred. Each proposed change at the Site was properly reviewed in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code §4371 et seq.), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the USAF NEPA regulation (32 CFR Part 989). To date, no complaints have been received from the public due to any explosives or other testing conducted at the GRABS Site.

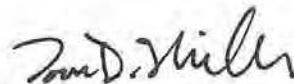
Given the length of time that has elapsed since the 1993 EA, DTRA and the USAF have determined the preparation of an updated EA is appropriate. This EA will assess ongoing and enhanced testing and associated training activities at the GRABS Site, using current environmental data and current testing terminology, which may have changed over the course of the last 19 years. Testing at the GRABS Site involves the design, analysis, and testing of structures, new equipment, and explosives. The types of structures involved may include personnel protective structures, missile silos, bunkers, aircraft hangars, antennas, and tunnels. The existing net explosive weight limit of 900 pounds used at the Site would not change. DTRA would continue to follow and implement existing health and safety plans. The EA describes ongoing testing and associated training activities at the Site, as well as any reasonably foreseeable proposed future activities at the Site. The location of the GRABS Site and existing facilities and features are shown on the attached Figure 1.

This EA is being prepared in accordance with NEPA, CEQ regulations implementing NEPA, and the USAF NEPA regulation. This EA evaluates the potential impacts of the proposed action and alternatives, to include the no action alternative, on humans and the natural environment. Additionally, Executive Order 12372, *Intergovernmental Review of Federal Programs*, requires federal agencies to solicit other federal agency participation in the NEPA process. Accordingly, I am requesting your participation in the review and comment process. Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available at <http://www.kirtland.af.mil> under the environmental tab.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA; 36 CFR Parts 800.2, 800.3, and 800.4) and EO 13175, the USAF would like to initiate government to government consultation concerning the proposed project to allow you the opportunity to identify any comments, concerns, and/or suggestions that you might have. Additionally, as we move forward through the process, various draft documents will be forwarded for your review and comment.

Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project and/or proceed with Section 106 consultation.

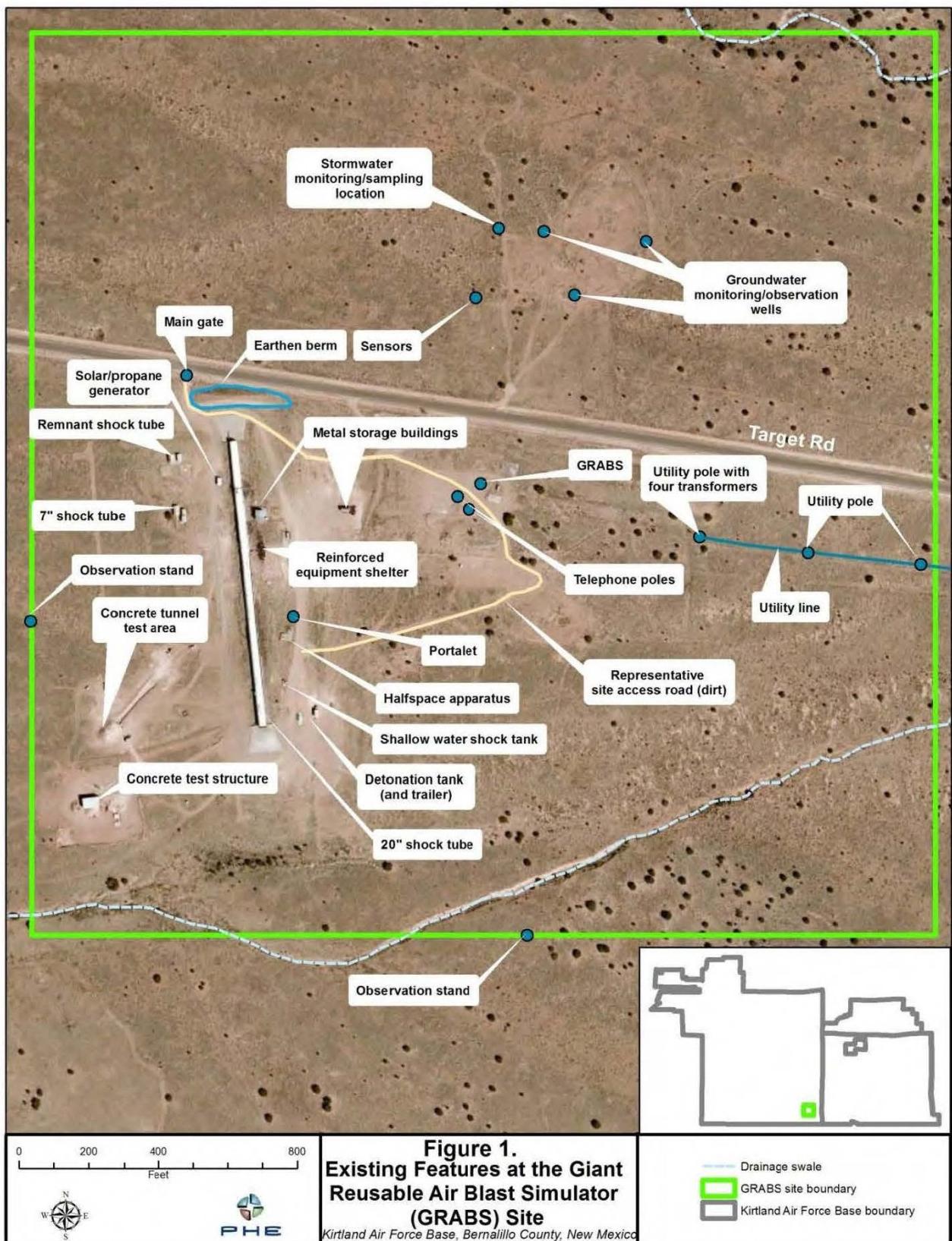
Sincerely



TOM D. MILLER, Colonel, USAF  
Commander

Attachment:

Figure 1. Location of Giant Reusable Air Blast Simulator (GRABS) Site and Existing Features Found at the GRABS Site



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**Tribal Public Notice Letter Response**

THE  
NAVAJO  
NATION



BEN SHELLY  
PRESIDENT

REX LEE JIM  
VICE-PRESIDENT

Historic Preservation Department, POB 4950, Window Rock, AZ 86515 • PH: 928.871.7198 • FAX: 928.871.7886

December 10, 2014

Tom D. Miller, Colonel Commander  
Department of the Air Force  
Headquarters 377<sup>th</sup> Air Base Wing  
2000 Wyoming Blvd SE Suite E-3  
Kirtland AFB, NM 87117

**Subject: GIANT REUSABLE AIR BLAST SIMULATOR SITE FOR EXPLOSIVE TESTING**

Dear Mr. Miller,

The Historic Preservation Department-Traditional Culture Program, hereafter (HPD-TCP) is in receipt of the letter notification for the proposed testing and associated training use of the Giant Reusable Air Blast Simulator Site for Explosives Testing located within the southeastern portion of Kirtland Air Force Base.

After reviewing the information documents provided, HPD-TCP has concluded that this particular initiative **will not have adverse affects to Navajo Traditional Cultural Properties**. HPD-TCP on behalf of the Navajo Nation has no concerns at this time.

If the proposed application inadvertently discovers habitation sites, plant gathering areas, human remains and objects of cultural patrimony, HPD-TCP request that we be notified respectively in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA). (*The Navajo Nation claims cultural affiliation to all Anasazi people (periods from Archaic to Pueblo IV) of the southwest. The Navajo Nation makes this claim through Navajo oral history and ceremonial history, which has been documented as early as 1880 and taught from generation to generations.*)

The HPD-TCP appreciates the Department of the Air Force's consultation efforts regarding this document. Should you have any additional concerns and/or questions do not hesitate to contact me electronically at [tony@navajohistoricpreservation.org](mailto:tony@navajohistoricpreservation.org) or telephone at 928-871-7750.

Sincerely,

A handwritten signature in black ink, appearing to read "Tony H. Joe, Jr." followed by a stylized surname.

Tony H. Joe, Jr., Supervisory Anthropologist  
Section 106 Consultation  
Traditional Culture Program  
Historic Preservation Department

TCP File: 14-563

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**APPENDIX F**

**BACILLUS THURINGIENSIS**

**PESTICIDE INFORMATION PROFILE**



Bacillus Thuringiensis

Page 1 of 7

[PMEP Home Page](#) ► [Pesticide Active Ingredient Information](#) ► [EXTOXNET: The Extension Toxicology Network](#) ► [24-d to Captan](#) ► [Bacillus Thuringiensis](#)

# EXTOXNET

Extension Toxicology Network

A Pesticide Information Project of Cooperative Extension Offices of Cornell University, Michigan State University, Oregon State University, and University of California at Davis. Major support and funding was provided by the USDA/Extension Service/National Agricultural Pesticide Impact Assessment Program.

Pesticide  
Information  
Profile

## Bacillus Thuringiensis

Publication Date: 5/94

### TRADE OR OTHER NAMES

Berliner (B.t. variety kurstaki): Dipel, Thuricide, Bactospeine, Leptox, Novabac, Victory, Certan (B.t. variety aizawa). Teknar (B.t. variety israelensis).

### REGULATORY STATUS

This microbial insecticide was originally registered in 1961 as a general use insecticide. A registration standard, issued in 1986 by the U.S. Environmental Protection Agency (EPA), required manufacturers to make minor changes in label precautions and to provide additional data on the effects of B.t. on nontarget organisms. While EPA considers the toxicological data base for B.t. complete, the Agency is still requiring more ecological effects data. Check with specific state regulations for local restrictions which may apply.

### INTRODUCTION

Bacillus thuringiensis (B.t.) is a naturally-occurring soil bacterium that produces poisons which cause disease in insects. A number of insecticides are based on these toxins (8). B.t. is considered ideal for pest management because of its specificity to pests and because of its lack of toxicity to humans or the natural enemies of many crop pests (14). There are different strains of B.t., each with specific toxicity to particular types of insects: B.t. aizawai (B.t.a.) is used against wax moth larvae in honeycombs; B.t. israelensis (B.t.i.) is effective against mosquitoes, blackflies and some midges; B.t. kurstaki (B.t.k.) controls various types of lepidopterous insects, including the gypsy moth and cabbage looper. A new strain, B.t. san diego, has been found to be effective against certain beetle species and the boll weevil. In order to be effective, B.t. must be eaten by insects in the immature, feeding stage of development referred to as larvae. It is ineffective against adult insects. Monitoring the target insect population before application insures that insects are in the vulnerable larval stage (9). More than 150 insects, mostly lepidopterous larvae, are known to be susceptible in some way to B.t. (5).

Bacteria are primitive one-celled organisms, which belong to a group of organisms called prokaryotes. Prokaryotes are neither plants nor animals. Like certain members of the plant kingdom, such as ferns and mushrooms, B. t. forms asexual reproductive cells, called spores, which enable it to survive in adverse conditions. During the process of spore formation, B.t. also produces unique crystalline bodies as a companion product. The spores and crystals of B.t. must be eaten before they can act as poisons in

Bacillus Thuringiensis

Page 2 of 7

the target insects, B.t. is therefore referred to as a stomach poison (7). B.t. crystals dissolve in response to intestinal conditions of susceptible insect larvae. This paralyzes the cells in the gut, interfering with normal digestion and triggering the insect to stop feeding on host plants. B.t. spores can then invade other insect tissue, multiplying in the insect's blood, until the insect dies. Death can occur within a few hours to a few weeks of B.t. application, depending on the insect species and the amount of B.t. ingested (7, 13).

## TOXICOLOGICAL EFFECTS

### ACUTE TOXICITY

No complaints were made after eighteen humans ate one gram (g) of commercial B.t. preparation daily for five days, on alternate days. Some inhaled 100 milligrams (mg) of the powder daily, in addition to the dietary dosage (6). Humans who ate one g/day of B.t.k. for three consecutive days were not poisoned or infected (12).

Since it was one of the first biological control agents registered for use against insects in the U.S., B.t. had to undergo a testing program which was more thorough than that which the EPA currently requires for biological pesticides. As a result, there are no data gaps in the toxicity information required by the EPA for registration purposes. A wide range of studies have been conducted on test animals, using several routes of exposure. (The highest dose tested was  $6.7 \times 10$  to the 11th spores per animal.) The results of these tests suggest that the use of B.t. products can cause few, if any, negative effects. B.t. did not have acute toxicity in other tests conducted on birds, dogs, guinea pigs, mice, rats, humans, or other animals. When rats were injected with B.t.k., no toxic or virus-like effects were seen. No oral toxicity was found in rats, mice or Japanese quail fed protein crystals from B.t. var. israelensis (19).

Very slight irritation was observed in test animals from inhalation and dermal exposure. This may have been caused by the physical rather than the biological properties of the B.t. formulation tested (14). Mice survived one or more 1-hour periods of breathing mist that contained as many as  $6.0 \times 10$  to the 10th spores of B.t. per cubic meter (m<sup>3</sup>) (6). No toxic effects were observed in rats that had a B.t. formulation put directly into their lungs, at rates of 5 mg/kg of body weight (1).

The amount of formulated insecticide that killed 50% of the rats experimentally fed the material ranges from 2.65 to greater than five grams per kilogram (g/kg) (1, 12). This amount is referred to as the lethal dose fifty (LD<sub>50</sub>) for B.t. in rats. Single oral dosages of up to 10,000 milligram per kilogram (mg/kg) of body weight did not produce toxicity in mice, rats or dogs (1).

The dermal LD<sub>50</sub> for a formulated B.t. product in rabbits was 6,280 mg/kg. Some reversible abnormal redness of the skin was observed when 1 mg/kg/day of formulated B.t. product was put on scratched skin for 21 days. No general, systemic poisoning was observed. A single dermal application of 7.2 g/kg of B.t. was not toxic to rabbits (1).

B.t. crystals have caused deaths in test animals when they were injected directly into the abdominal cavity. This suggests that B.t. can be toxic to mammals, but that when exposure is through normal routes of exposure (oral, dermal or inhalation), metabolism or elimination of the toxin prevents poisoning in mammals (19).

### CHRONIC TOXICITY

Bacillus Thuringiensis

Page 3 of 7

No complaints were made by eight men after they were exposed for seven months to fermentation broth, moist bacterial cakes, waste materials, and final powder created during the commercial production of B.t. (6).

There is no evidence of chronic B.t. toxicity in dogs, guinea pigs, rats, humans or other test animals. Thirteen-week dietary administration of B.t. to rats at dosages of 8,400 mg/kg did not produce toxic effects (14).

### **Reproductive Effects**

This literature review did not produce any information on the effects of B.t. exposure to reproductive systems.

### **Teratogenic Effects**

There is no evidence indicating that formulated B.t. can cause birth defects in mammals (1).

### **Mutagenic Effects**

B. thuringiensis appears to have mutagenic potential in plant tissue. Extensive use of B.t. on food plants might be hazardous, given its mutagenic potential (6).

### **Carcinogenic Effects**

Tumor-producing effects were not seen in two-year chronic studies during which rats were given dietary doses of 8,400 mg/kg of B.t. formulation (1).

### **Organ Toxicity**

No additional information was found on the harmful effects of B.t. to organs.

### **Fate in Humans and Animals**

While B.t. interferes with insect digestion, it does not persist in the digestive systems of mammals that ingest it. When placed in the eyes of rabbits, Bt var. israelensis was still present after 1 week, but there was no infection or other harmful effect to the eye. When injected into the gut of mice, Bt var. israelensis was detected in the spleen and heart blood for as long as 80 days, but there were no infections (16).

## **ECOLOGICAL EFFECTS**

### **Effects on Birds**

B.t. is not toxic to birds (2, 15). It biodegrades and does not persist in the digestive systems of birds (9). The LD50 for bobwhite quail was greater than 10,000 mg of B.t. per kg body weight. When autopsies were performed on these birds, no pathology was attributed to B.t. Field observations of 74 bird species did not reveal any population changes after aerial spraying of the B.t. formulation (1).

### **Effects on Aquatic Organisms**

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B.t. has not been reported as having harmful effects in fish (2). Rainbow trout and bluegills exposed for 96 hours to B.t. technical material, at concentrations of 560 and 1,000 parts per million (ppm), did not show adverse effects. A small marine fish (*Anguilla anguilla*) was not negatively affected by exposure to 1,000-2,000 times the level of B.t. expected during spray programs. Field observations of populations of brook trout, common white suckers and smallmouth bass did not reveal adverse effects one month after aerial application of the B.t. formulation (1).

#### Effects on Other Animals (Nontarget species)

Applications of labeled rates of formulated B.t. have not been toxic to beneficial or predator insects (1). Treatment of honeycombs with B.t. var. *aizawai* will not have a detrimental effect upon bees, nor on the honey produced (4). Normal exposure rates do not cause harm to honey bees. Very high concentrations (108 spores/ml sucrose syrup) of B.t. var. *tenebrionis*, which is used against beetles such as the Colorado potato beetle, reduced longevity of honey bee adults but did not cause disease (17).

As of 1986, EPA had not completed its assessment of the potential impact of certain uses of B.t. on endangered and/or threatened species of moths and butterflies. Concern was expressed regarding its potential to kill endangered species of butterflies, along with target pests (9).

Users of B.t. are encouraged to consult local officials or the nearest EPA regional office responsible for protecting endangered species before using B.t. products in counties where susceptible endangered species of Lepidoptera are known to be present. (In California: Los Angeles, Contra Costa, Mendocino, San Francisco, San Mateo, Monterey, and Kern Counties; in Florida: Date and Monroe Counties; in Washington: Pacific and Tillamook Counties; and Lane County in Oregon) (12). Death occurs in some nontarget insect species when B.t. is applied at rates used for mosquito control. Results of other experimental testing do not suggest that B.t. adversely affects nontarget insects or aquatic invertebrates. It did not have negative effects on frogs and salamanders (2).

## ENVIRONMENTAL FATE

B.t. is a naturally-occurring pathogen that readily breaks down in the environment. As a biological entity, it is subject to death and inactivation in the same fashion as all living things (1, 5). B.t. is degraded very rapidly when exposed to UV light. Its half-life under normal sunlit conditions is 3.8 hours. Formulations of B.t. spores and crystals encapsulated in starch lost all spore viability and insecticidal activity within 4 days (18). Due to its short biological half-life and its specificity, B.t. is less likely than other chemical pesticides to cause field resistance in target insects. In enclosed situations, however, B.t. resistance has been reported in a stored grain pest, the Indian meal moth (9). Because this material readily biodegrades in the environment, it poses little or no disposal problem (11).

#### Breakdown of Chemical in Soil and Groundwater

Under suitable conditions, B.t. can persist for several months in soil. Its spores are released into the soil from decomposing dead insects after they have been killed by the bacterium. B.t. is rapidly inactivated in soils that have a pH below 5.1 (1, 5).

Microbial pesticides such as B.t. are classified as immobile because they do not move, or leach, with groundwater. Because of their rapid biological breakdown and low toxicity, they pose no threat to groundwater.

#### Breakdown of Chemical in Water

<http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/bt-ext.html>

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The EPA has not issued restrictions for the use of B.t. around bodies of water. It can be effective for up to 48 hours in water. Afterwards, it gradually settles out or adheres to suspended organic matter (2).

### Breakdown of Chemical in Vegetation

Since it does not spread, B.t. must be applied to the parts of the plants that are normally attacked by lepidopterous larvae, or to the particular zones of water in which dipterous larvae feed. It is relatively short-lived on foliage because the ultraviolet (UV) light of the sun destroys it very rapidly, and rain washes it onto the soil. The bacterium is nonphytotoxic, or not poisonous to plants, and has not shown any adverse effect upon seed generation or plant vigor (2).

## PHYSICAL PROPERTIES AND GUIDELINES

The insecticidal action of B.t. is attributed to protein crystals produced by the bacterium. The vegetative cells of B.t. are approximately one micrometer (mcm) in width and 5 mcm in length, and are motile (12). The commercial product contains about  $2.5 \times 10$  to the 11th viable spores per gram. Typical agricultural formulations that contain spores and protein crystals include wettable powders, spray concentrates, liquid concentrates, dusts, baits, and time release rings (4, 6, 14).

B.t. products should be stored in a cool, dry place. Some loss of effectiveness can be expected in products stored for more than six months (2). Formulated products are compatible with most insecticides, acaricides, fungicides and plant growth regulators; they are not compatible with captan, dinocap, alkaline sprays or, under some conditions, leaf or foliar nutrients (4, 14).

### Physical Properties

CAS #:	(B.t. variety kurstaki) 68038-71-1
H <sub>2</sub> O solubility:	emulsifies (3); suspendable (10); -- vars. israelensis and kurstaki: insoluble in water (4)
Solubility in other solvents:	vars. israelensis and kurstaki: insoluble in organic solvents (4)
Flash point:	over 400 degrees, var. kurstaki (3)
Chemical Class/Use:	Biological insecticide

There have been reports of air emissions of 0.5 kg of particulates per metric ton of pesticide produced (11)

## BASIC MANUFACTURERS

Sandoz Crop Protection Corp.  
1300 E. Touhy Ave.  
Des Plaines IL 60018

Abbott Laboratories  
Chem. and Agric. Prod. Div.  
1401 Sheridan Rd.  
North Chicago, IL 60064

### Review by Basic Manufacturer - Abbott Labs:

<http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/bt-ext.html>

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Comments solicited: November, 1992

Comments received:

#### Review by Basic Manufacturer - Sandoz:

Comments solicited: November, 1992

Comments received: December, 1993

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For more information relative to pesticides and their use in New York State, please contact the PMEP staff at:

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**APPENDIX G**

**AIR QUALITY**

**SUPPORT DOCUMENTATION**



General Vehicle Mixture

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POV	0.3755	0.6032	0	0.0003	0.002	0	0.019
GOV	0.5449	0.3773	0.0467	0	0	0.0311	0

GOV = government-owned vehicle; HDDV = heavy-duty diesel vehicle; HDGV = heavy-duty gasoline vehicle; LDDT = light-duty diesel truck; LDDV = light-duty diesel vehicle; LDGT = light-duty gasoline truck; LDGV = light-duty gasoline vehicle; MC = motorcycle; POV = personally-owned vehicle.

Emission Factors

	VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
LDGV	0.535	0.0068	0.4	9.2	0.0248	0.0113	368.1
LDGT	0.767	0.0095	0.637	10.83	0.0249	0.0114	516.3
HDGV	0.976	0.0165	1.011	27.01	0.0453	0.0294	905.6
LDDV	0.119	0.0029	0.163	0.774	0.0485	0.033	314.1
LDDT	0.368	0.0056	0.416	0.676	0.0561	0.04	598.6
HDDV	0.649	0.0116	2.87	2.047	0.1101	0.0827	1243.9
MC	2.81	0.0033	0.85	27.09	0.0372	0.0207	177.4

CO = carbon monoxide; CO<sub>2</sub> = carbon dioxide; HDDV = heavy-duty diesel vehicle; HDGV = heavy-duty gasoline vehicle; LDDT = light-duty diesel truck; LDDV = light-duty diesel vehicle; LDGT = light-duty gasoline truck; LDGV = light-duty gasoline vehicle; MC = motorcycle; NOx = nitrogen oxide; PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 2.5 microns; PM<sub>10</sub> = particulate matter with a diameter less than or equal to 10 microns; SOx = sulfur oxide; VOC = volatile organic compound

Personnel Emissions

personnel vehicle miles travel for work days per year

personnel vehicles X work days X average commute

up to 12 vehicles per event. Each event lasts approx. 4 days. Approx. 20 events per year.

Approx. 20 mile commute

12 X 80 X 20

1920 VMTp

Personnel emissions = VMTp X conversion factor X vehicle mixture X emission factor

POV Personnel Emissions

	VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
LDGV	4.25 X 10 <sup>-3</sup>	5.40 X 10 <sup>-5</sup>	3.18 X 10 <sup>-3</sup>	0.0731	1.97 X 10 <sup>-4</sup>	8.98 X 10 <sup>-5</sup>	2.93
LDGT	9.79 X 10 <sup>-3</sup>	1.21 X 10 <sup>-4</sup>	8.13 X 10 <sup>-3</sup>	0.138	3.18 X 10 <sup>-4</sup>	1.46 X 10 <sup>-4</sup>	6.59
HDGV	0	0	0	0	0	0	0
LDDV	7.56 X 10 <sup>-7</sup>	1.84 X 10 <sup>-8</sup>	1.04 X 10 <sup>-6</sup>	4.92 X 10 <sup>-6</sup>	3.08 X 10 <sup>-7</sup>	2.09 X 10 <sup>-7</sup>	1.99 X 10 <sup>-3</sup>
LDDT	1.56 X 10 <sup>-5</sup>	2.37 X 10 <sup>-7</sup>	1.76 X 10 <sup>-5</sup>	2.86 X 10 <sup>-5</sup>	2.37 X 10 <sup>-6</sup>	1.69 X 10 <sup>-6</sup>	0.0253
HDDV	0	0	0	0	0	0	0

<b>MC</b>	$1.13 \times 10^{-3}$	$1.33 \times 10^{-6}$	$3.42 \times 10^{-4}$	0.0109	$1.50 \times 10^{-5}$	$8.32 \times 10^{-6}$	0.0713
<b>Total</b>	0.0152	$1.77 \times 10^{-4}$	0.0117	0.222	$5.33 \times 10^{-4}$	$2.46 \times 10^{-4}$	9.62

**GOV Personnel Emissions**

	<b>VOC</b>	<b>SOx</b>	<b>NOx</b>	<b>NO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>CO<sub>2</sub></b>
<b>LDGV</b>	$6.17 \times 10^{-3}$	$7.84 \times 10^{-5}$	$4.61 \times 10^{-3}$	0.106	$2.86 \times 10^{-4}$	$1.30 \times 10^{-4}$	4.25
<b>LDGT</b>	$6.13 \times 10^{-3}$	$7.59 \times 10^{-5}$	$5.09 \times 10^{-3}$	0.0865	$1.99 \times 10^{-4}$	$9.10 \times 10^{-5}$	4.12
<b>HDGV</b>	$9.65 \times 10^{-4}$	$1.63 \times 10^{-5}$	$9.99 \times 10^{-4}$	0.0267	$4.48 \times 10^{-5}$	$2.91 \times 10^{-5}$	0.895
<b>LDDV</b>	0	0	0	0	0	0	0
<b>LDDT</b>	0	0	0	0	0	0	0
<b>HDDV</b>	$4.27 \times 10^{-4}$	$7.64 \times 10^{-6}$	$1.89 \times 10^{-3}$	$1.35 \times 10^{-3}$	$7.25 \times 10^{-5}$	$5.44 \times 10^{-5}$	0.819
<b>MC</b>	0	0	0	0	0	0	0
<b>Total</b>	0.0137	$1.78 \times 10^{-4}$	0.0126	0.221	$6.02 \times 10^{-4}$	$3.05 \times 10^{-4}$	10.08

**Demolition Emissions**

fugitive dust = 0.009072 tons PM<sub>10</sub> max for all test events (0.0004536/test event)

construction exhaust emissions per phase emission factor

<b>VOC</b>	<b>SOx</b>	<b>NOx</b>	<b>CO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>CO<sub>2</sub></b>
0.013104	0.000126	0.089586	0.067428	0.00612	0.00612	12.024

vehicle exhaust emissions per phase

VMTVE = bldg area X bldg height X (1/27) X 0.25 X (1/avg haul truck capacity) X avg haul truck commute  
 $360 \times 6 \times 0.037 \times 0.25 \times 0.05 \times 20$

19.98

emissions = (19.98 X conversion factor X emission factor)/2000

	<b>VOC</b>	<b>SOx</b>	<b>NOx</b>	<b>CO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>CO<sub>2</sub></b>
<b>HDDV</b>	$1.43 \times 10^{-5}$	$2.56 \times 10^{-7}$	$6.32 \times 10^{-5}$	$4.51 \times 10^{-5}$	$2.43 \times 10^{-6}$	$1.82 \times 10^{-6}$	0.0274

Worker trips emissions per phase VMTWT

	<b>VOC</b>	<b>SOx</b>	<b>NOx</b>	<b>CO</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>CO<sub>2</sub></b>
<b>LDGV</b>	$6.64 \times 10^{-4}$	$8.43 \times 10^{-6}$	$4.96 \times 10^{-4}$	0.0114	$3.08 \times 10^{-5}$	$1.40 \times 10^{-5}$	0.457
<b>LDGT</b>	$9.51 \times 10^{-4}$	$1.18 \times 10^{-5}$	$7.90 \times 10^{-4}$	0.0134	$3.09 \times 10^{-5}$	$1.41 \times 10^{-5}$	0.640
<b>Total</b>	$1.61 \times 10^{-3}$	$2.02 \times 10^{-5}$	$1.29 \times 10^{-3}$	0.0248	$6.16 \times 10^{-5}$	$2.82 \times 10^{-5}$	1.10

**Construction Emissions**

construction exhaust emissions per phase  
# total work days X avg worker commute X 1.25 X # equipment  
30 X 20 X 1.25 X 3  
2250

**Emission factors (construction)**

VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
0.0131	1.26 X 10 <sup>-4</sup>	0.0896	0.0674	6.12 X 10 <sup>-3</sup>	6.12 X 10 <sup>-3</sup>	12.02

emissions = (2250 X conversion factor X emission factor X vehicle mixture)/2000

**Vehicle exhaust emissions per phase**

VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
1.30 X 10 <sup>-4</sup>	2.32 X 10 <sup>-6</sup>	5.74 X 10 <sup>-4</sup>	4.09 X 10 <sup>-4</sup>	2.20 X 10 <sup>-5</sup>	1.65 X 10 <sup>-5</sup>	0.249

**Worker trips emissions per phase**

	VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
<b>LDGV</b>	6.63 X 10 <sup>-4</sup>	8.43 X 10 <sup>-6</sup>	4.96 X 10 <sup>-4</sup>	0.0114	3.08 X 10 <sup>-5</sup>	1.40 X 10 <sup>-5</sup>	0.457
<b>LDGT</b>	9.51 X 10 <sup>-4</sup>	1.18 X 10 <sup>-5</sup>	7.90 X 10 <sup>-4</sup>	0.0134	3.09 X 10 <sup>-5</sup>	1.41 X 10 <sup>-5</sup>	0.640
<b>Total</b>	1.61 X 10 <sup>-3</sup>	2.02 X 10 <sup>-5</sup>	1.29 X 10 <sup>-3</sup>	0.0248	6.16 X 10 <sup>-5</sup>	2.82 X 10 <sup>-5</sup>	1.10

**Vendor Emissions**

VMTvt = bldg area X bldg height X (0.38/1000) X avg haul truck commute  
360 X 6 X 0.00038 X 20  
16.416

emissions = (16.416 X conversion factor X emission factor X)/2000

	VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
<b>HDDV</b>	1.17 X 10 <sup>-5</sup>	2.10 X 10 <sup>-7</sup>	5.19 X 10 <sup>-5</sup>	3.70 X 10 <sup>-5</sup>	1.99 X 10 <sup>-6</sup>	1.50 X 10 <sup>-6</sup>	0.0225

**Site Grading Emissions**

fugitive dust = 0.0016529 tons PM<sub>10</sub> max for all test events (0.000082645/test event)

**construction exhaust emissions per phase**  
 $= (\# \text{ equipment} \times \# \text{ work days} \times \text{hours per day} \times \text{emission factor})/2000$   
 $(3 \times 20 \times 4 \times \text{emission factor})/2000$

VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
8.74 X 10 <sup>-3</sup>	8.40 X 10 <sup>-5</sup>	0.0597	0.0449	4.08 X 10 <sup>-3</sup>	4.08 X 10 <sup>-3</sup>	8.02

**Worker trips emissions per phase**  
 $= \text{work days} \times \text{worker commute} \times 1.25 \times \# \text{ equipment}$   
 $20 \times 20 \times 1.25 \times 3$   
1500

emissions = (1500 X conversion factor X emission factor X vehicle mixture)/2000

	VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
LDGV	4.42 X 10 <sup>-4</sup>	5.62 X 10 <sup>-6</sup>	3.31 X 10 <sup>-4</sup>	7.61 X 10 <sup>-3</sup>	2.05 X 10 <sup>-5</sup>	9.34 X 10 <sup>-6</sup>	0.304
LDGT	6.34 X 10 <sup>-4</sup>	7.86 X 10 <sup>-6</sup>	5.27 X 10 <sup>-4</sup>	8.96 X 10 <sup>-3</sup>	2.06 X 10 <sup>-5</sup>	9.43 X 10 <sup>-6</sup>	0.427
Total	1.08 X 10 <sup>-3</sup>	1.35 X 10 <sup>-5</sup>	8.57 X 10 <sup>-4</sup>	0.0166	4.11 X 10 <sup>-5</sup>	1.88 X 10 <sup>-5</sup>	0.731

#### Total emissions per phase

VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
0.0683	7.48 X 10 <sup>-4</sup>	0.267	0.689	0.0182	0.0170	54.99

#### Total emissions for "worst case scenario" of 20 test events

VOC	SOx	NOx	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
1.37	0.0150	5.35	13.79	0.364	0.339	1099.77